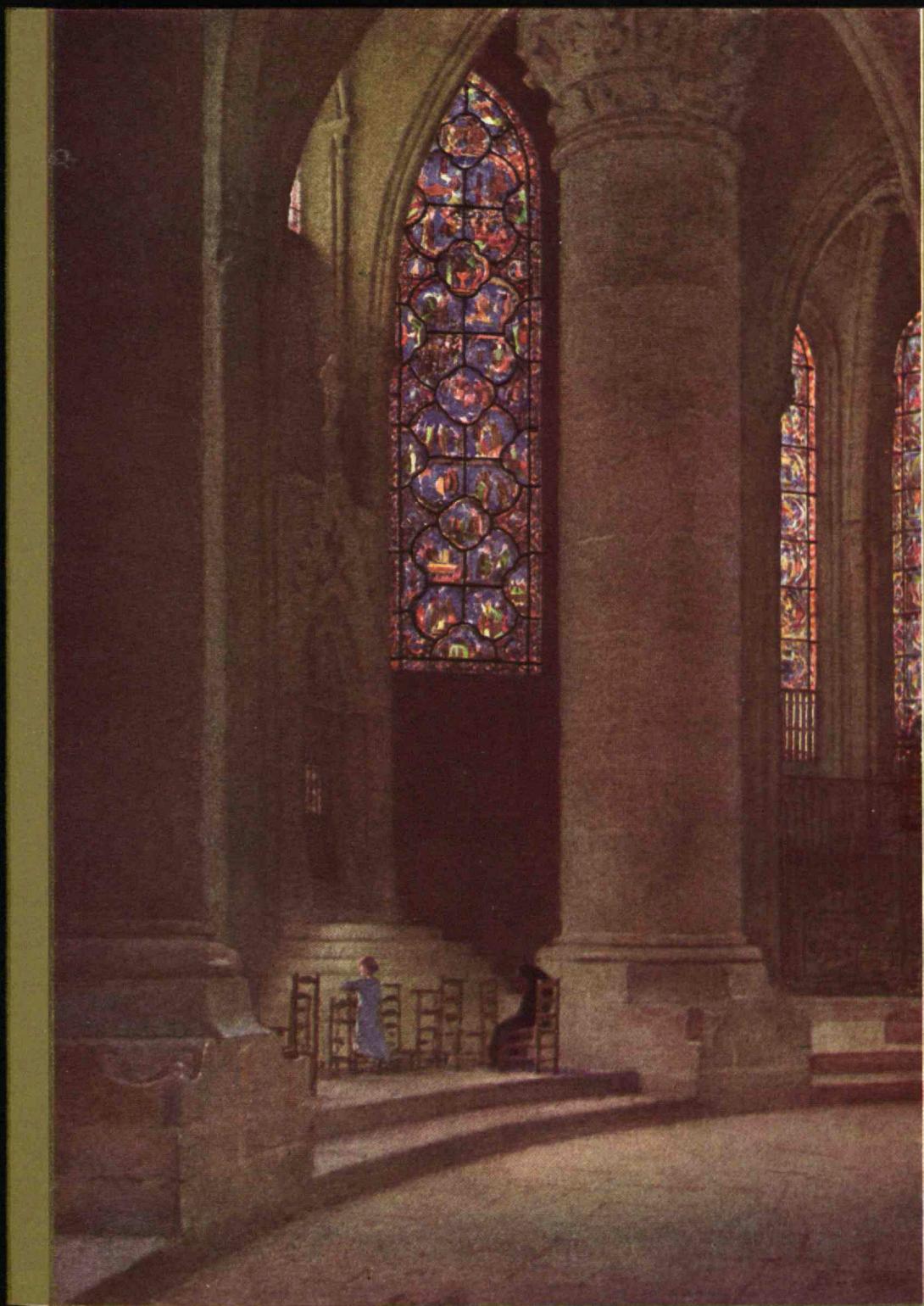


THE TECHNOLOGY REVIEW

DECEMBER 1930



technology review

Published by MIT

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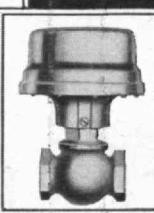
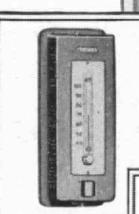
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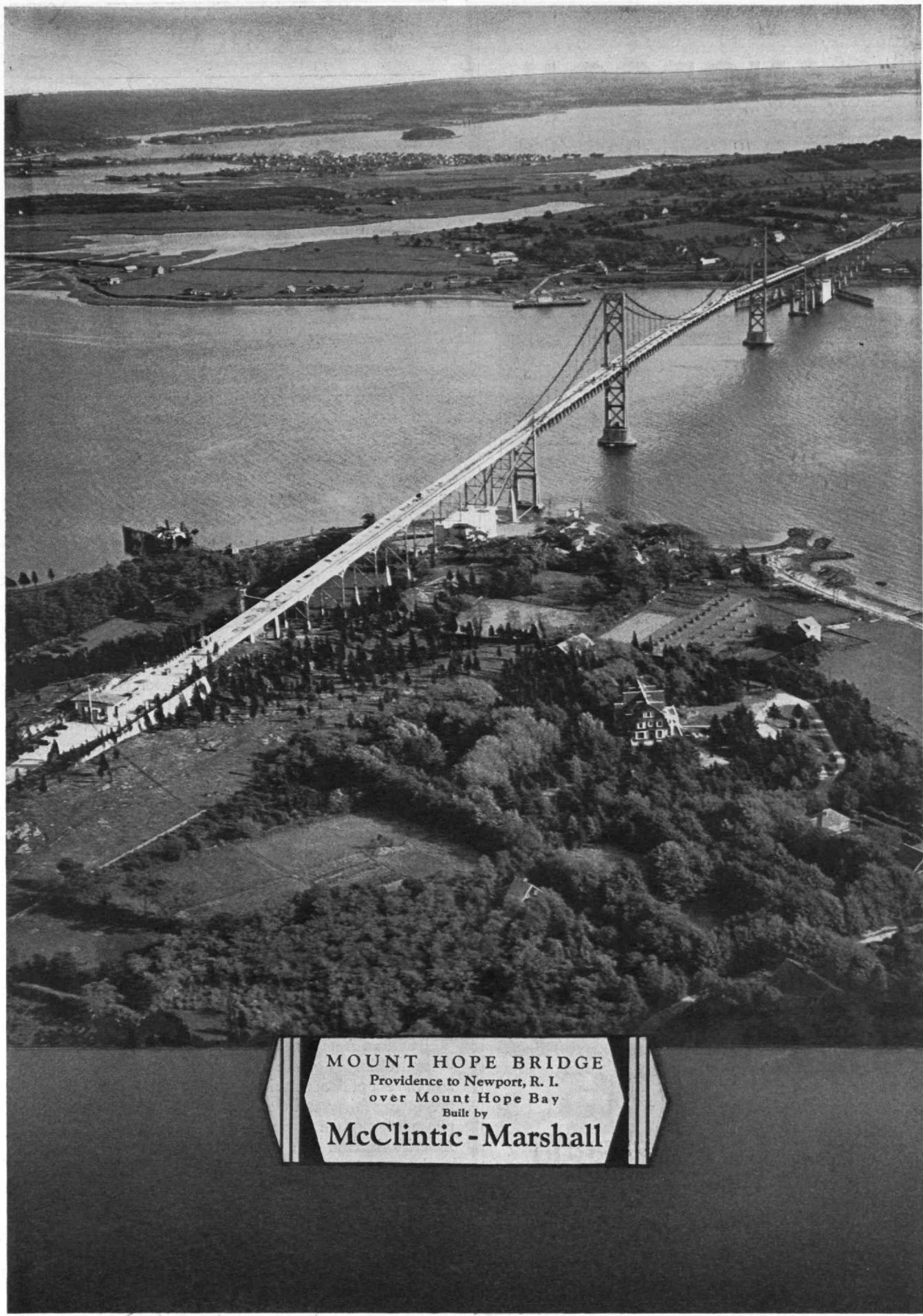
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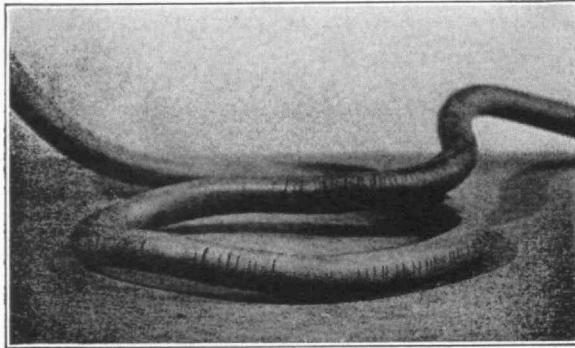
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THE TABULAR VIEW

HAROLD B. RICHMOND, '14, author of "Radio's Growing Pains" in this issue of the Review, is especially qualified to write upon the problems of the radio industry. As a prominent figure in the radio field, he presents here information that is authoritative, and nowhere have we seen such a lucid explanation of the complicated patent situation that faces the radio industry or of the difficulties besetting the Federal Radio Commission. ¶ Last year Mr. Richmond was President of the Radio Manufacturers Association and at the present time occupies the position of Treasurer of the General Radio Company in Cambridge. During 1916 and 1917 he was a member of the instructing staff of the Department of Electrical Engineering at the Institute, and he has always been active in Institute affairs. His home is in Winchester.

THE article on aerial mapping was also written by a Technology graduate, Crockett A. Harrison of the Class of 1926. Mr. Harrison has worked in various aviation fields since his graduation from the Institute, and at one time he was engaged in aviation journalism. He is now in charge of Fairchild Aerial Camera sales in addition to doing advertising work for the Fairchild Airplane Manufacturing Corporation and Fairchild Aircraft, Ltd., of Montreal. ¶ Like radio broadcasting, the science of aerial surveying and mapping has grown from infancy to adulthood in the short period of ten years. Vast areas of the earth's surface never before mapped accurately are now being mapped and surveyed by airplane. Mr. Harrison describes the methods used in making the airplane and camera tools for the surveyor and cartographer.

KARL T. COMPTON needs no introduction to Review readers for, apart from his position as President of the Institute, he is well known as one of the most distinguished of living physicists. His article appearing in this issue of the Review is based on an address prepared by him for the radio. ¶ This is the second article the Compton family has contributed to the Review this year. Dr. Arthur Compton, author of "Looking Inside the Atom" which was published in the October Review, is President Compton's brother.

FROM an American engineer in Germany we learn the real opinions of the German people about Americans and the era of Americanization. The criticism is unbiased, presenting fairly and clearly the foreign attitude on this phase of modern society. In the light of this article Americanization is a growing movement — a modern tendency — not merely a patriotic and national characteristic. ¶ Hunter Rouse, '29, holds a fellowship from the Institute for the study of Hydraulic Engineering in Germany. In the time that Mr. Rouse has lived abroad, he has learned much that the summer traveler cannot possibly apprehend during a short sight-seeing visit.

(Continued on page 116)



*The Commons Room of the New Technology Dormitory is floored with *CELLized Oak Blocks, size 11 $\frac{1}{4}$ " square. Architects—Coolidge and Carlson, Boston. General Contractors—Chase and Gilbert, Boston. Flooring Contractors—Bloom, South and Gurney, Inc., 176 Federal Street, Boston.*

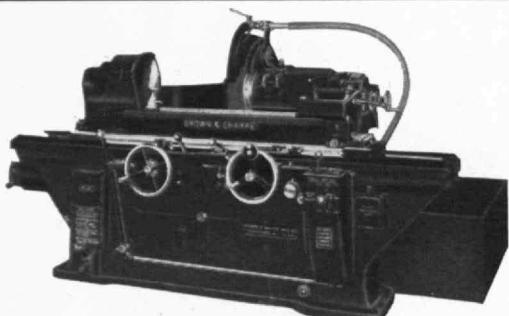
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THE TABULAR VIEW

(Continued from page 114)

OUR book reviewers for this issue are Messrs. Tenney L. Davis, George W. Adams, and Clair E. Turner. Mr. Davis has been a member of the Institute's faculty in the Department of Chemistry since 1919. He is also active in the American Chemical Society and was appointed Secretary of a division of the history of chemistry in 1927. Beside contributing other book reviews, he was the author of "Primitive Thinking," an article which appeared in the July (1929) Review on the beginnings of authentic science. Mr. Adams was formerly an instructor in English and History at Technology and is now studying at Harvard for his Ph.D. in History.

PROFESSOR Clair E. Turner, '17, is a leader in the field of public health work and training and a member of the Department of Biology and Public Health at the Institute. The phase of public health in which he is most interested is child health and its promotion in big public school programs. His belief in the value of visual aids in learning has led him to direct the filming of several highly interesting and informative motion pictures dealing with health subjects. Besides lecturing in this field he has written several books on health. The Public Health movement has become international in scope, and in 1927 Professor Turner became Chairman of the Health Section of the World Federation of Education.

THE REVIEW takes pleasure in announcing that it has arranged with the Scientific Book Club, Inc., to publish each month the books selected by that organization's Editorial Committee as the outstanding scientific books of the month. The book marts are flooded with popular science books, many of which are worthless and misleading in their information. It is the purpose of the Book Section of the Review to point out scientific books that are accurate and worthy and to present the comments of authorities on a few of these titles. By presenting the selections of the Scientific Book Club, Inc., we are enlarging the scope of this department for the benefit of the Review's growing roster of readers.

"INDUSTRY and Engineering in the Union of Socialist Soviet Republics" which the Review published in October and November created widespread comment. Among the letters received, the Review is happy to present the following.

To the Editor:

"I returned from U.S.S.R. a few weeks ago, where I lived for seven months of this year. The articles in the Review on 'Industry and Engineering in the Union of Socialist Soviet Republics' were of great interest to me, as they offered an opportunity to compare notes on that fearful country. While reading the articles, I could not dismiss two thoughts from my mind: One was that the anonymous engineer's impressions were produced in Moscow. The other, that he was probably in an advisory

(Concluded on page 118)

First modern subway *in South America* built in 21 months

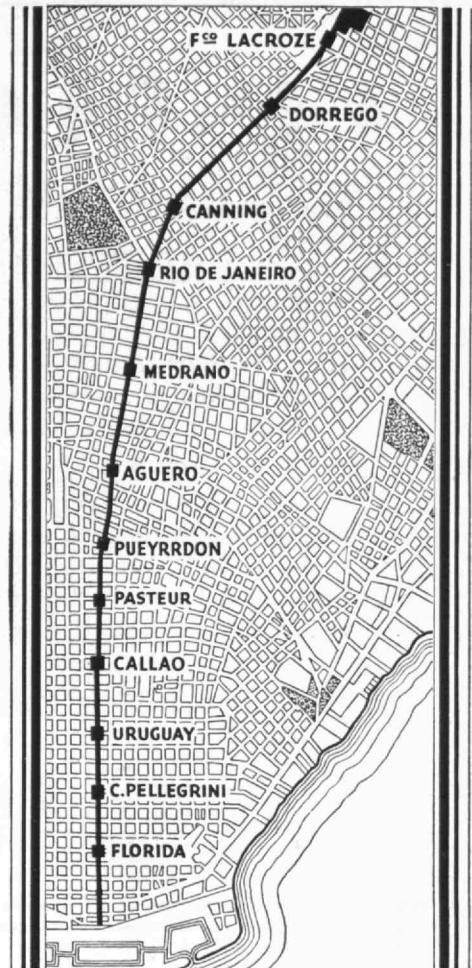


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E. S. Coldwell	'15
S. J. Cole	'26
J. A. Emery	'93
Page Golsan	'12
J. K. Heller	'16
G. I. Rhodes	'05
A. A. Uebelacker	'18
H. E. Whitaker	'09
J. E. Woodbridge	'93
R. P. Westerhoff	'27

Design Construction Management Reports

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Philadelphia Chicago San Francisco

THE TABULAR VIEW

(Concluded from page 116)

capacity and missed the trying but instructive task of working day after day with the Soviets upon whom the Moscow Dictators depend for the execution of details.

"Having been slightly deranged by the profuse display of red table covers at committee meetings, I shall employ the Soviet method of destruction in stating my variances with the author's views. I was surprised to know of the dancing, as public dancing was absolutely prohibited in our city. House parties were allowable, and I attended one at a Communist's apartment. The decrease in liquor consumption was not evident there, in spite of the rise in price of cognac to \$12 a liter.

"Working four days and attempting relaxation the fifth proved a constant strain to our commission. I think that the Russians are similarly affected and predict a gradual decrease in production due to health failure. At times they are forced to work the fifth, never regaining their lost rest day. The five-day week may have been 'purely economic,' but many a Moscow edict smacking of 'Industrialization' severs the tree from its roots. In Russia, the Church was the tree, its roots about 90 per cent of the people.

"My experience was that waiting crowds not only indicated 'very bad management' but generally a lack of everything. Our only abundance was in matches and kerosene, but who in hell can live on kerosene? About one-third of the eggs (if available) in government stores were rotten. Half the time, the milk was sour when purchased, or soon turned.

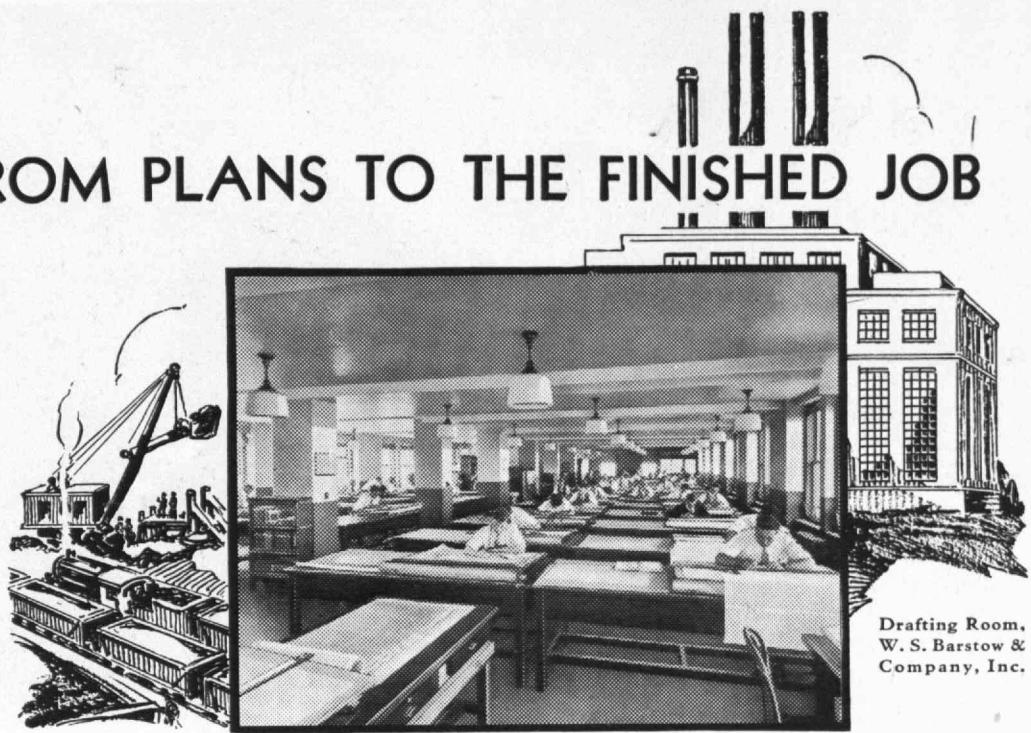
"The greatest strain on me, however, was at the office. Try as we might for weeks, we could get nothing to do. Then, we would be overwhelmed and work nights, only to find that someone had changed the requirements or location just before the plans were completed. Once I waited three weeks for information on railroad grades; then what I received was not right. The Russian in charge of us spoke excellent English, and he, personally, cooperated as well as he could. He had lived in America for many years. One morning he came to the office and on his door was a notice to the effect that he had been replaced. His successor, an ardent Communist, was a laborer with a few years' university training. No wonder the Five-Year Plan, or any other plan, fails.

"Now, the question is: who must shoulder the blame in 1933, when the Five-Year Plan is due to be completed? The Communistic Party? Never! The Soviet Engineers? Possibly some. The Foreign Specialists? Probably. The Germans were involved a few years ago and the British a few months ago. Now, there is a large demand for American Engineers in Russia."

Russell W. Ambach, '24.

HAROLD B. WARREN executed the water color which is reproduced on the cover of this issue. For many years he has been a Professor of Landscape Architecture at Harvard University and in 1916 and 1917 he was a Professor of Architecture at the Institute.

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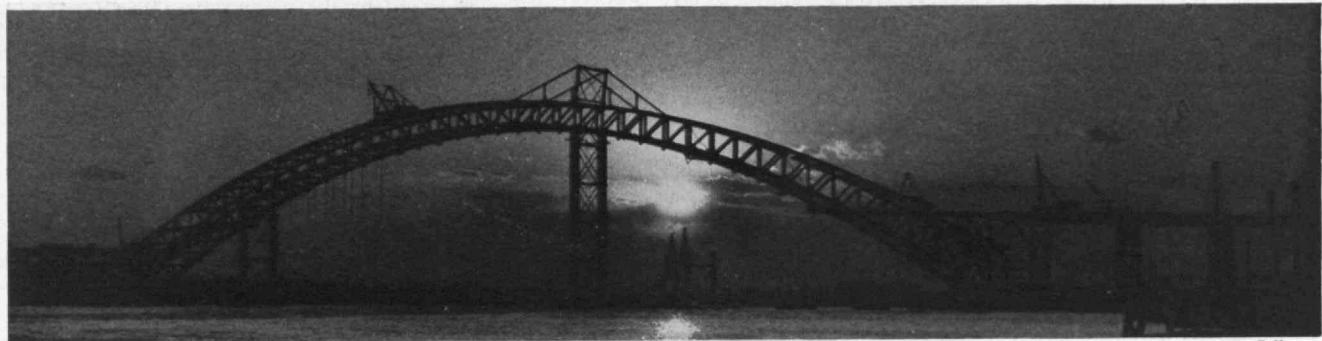
man in Los Angeles may talk with another in Baltimore or a friend in Europe as readily as with his neighbor.

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Galloway

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THE TECHNOLOGY REVIEW

Edited at the Massachusetts Institute of Technology

VOLUME XXXIV

NUMBER 3

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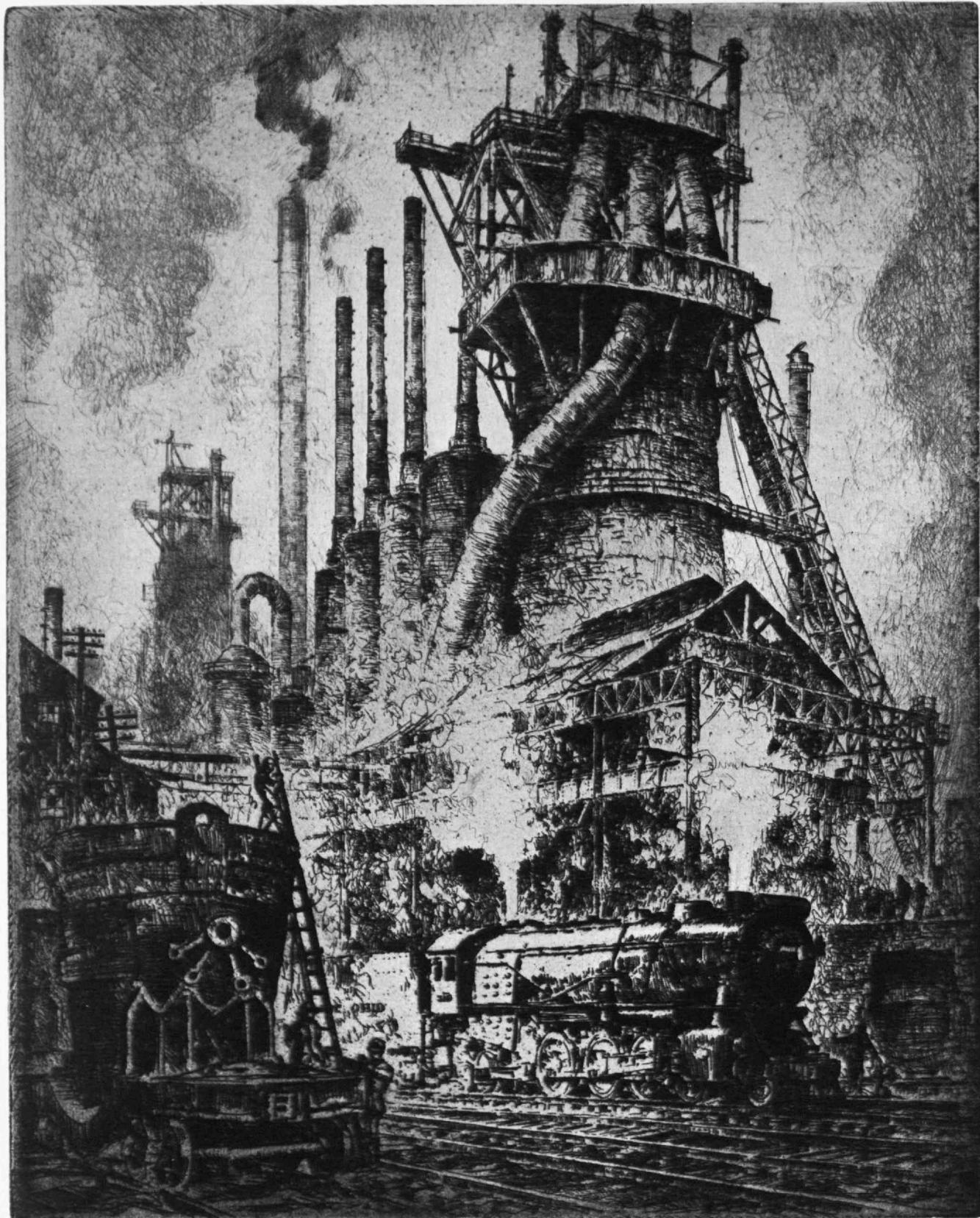
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O. Kuhler

CASTLES IN STEEL

FROM AN ETCHING BY OTTO KUHLER

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THE TECHNOLOGY REVIEW

VOLUME 33

DECEMBER, 1930

NUMBER 3

RADIO'S GROWING PAINS

Retarded by Patent Snarls and Legal Difficulties, It Nevertheless Approaches Technical Adulthood—Its Oligarchical Tendencies

BY HAROLD B. RICHMOND

ALTHOUGH radio telephony has been in use for well over 20 years, the last decade has witnessed the development of broadcasting, and with it the growth of radio from an insignificant unit in our economic system to a billion dollar industry. Including the amplifier field, represented by the reproducer equipment used in the talkie theatres and group-address systems, the annual output at consumer prices of the radio and vacuum-tube industry is \$1,200,000,000. This is approximately the same as the output of the rubber goods and tobacco industries, or the amount expended by the combined railroads of the country in their repair shops. Such a prodigious expansion must of necessity have been attended by many acute economic, engineering, and legal problems, and even today as radio settles down to a reliable unit in our country many of these problems still exist.

In surveying the present state of the industry, three groups present themselves for investigation. First, there is the broadcaster who places the programs on the air; then there are the manufacturers, including the distributors of receiving sets; and finally, the consumers, or, in radio terms, the listeners. These three interdependent groups are comparable to those involved in the distribution of news by the newspapers. The broadcaster is analogous to the advertiser, the manufacturer to the newspaper organization, and the listener to the reader. Just as the reader pays only a small fraction of the publication cost, so does the listener pay but a minute portion of the cost of radio broadcasts.

The listeners may be dismissed by the statement that they desire free programs pleasing to their taste, with a quality of reproduction equal to the original and free from offense. Most listeners are generously tolerant of the ratio of direct advertising to entertainment. Here again the listener is in much the same position as a reader of a newspaper. About one-half of the newspaper is devoted to paid material, and it is this fact that makes it possible for the reader to purchase his paper for only a small fraction of the total cost. But, always, the publisher holds reader interest to be of prime importance.

It is the analogous listener interest which is the goal of successful broadcasting.

It will not be until the actual commercial establishment of wired radio, that is, programs sent into the home over electric service or telephone wires, that we shall have a true measure of the listeners' viewpoint on advertising. The wired radio plans call for a monthly rental charge to defray both the operating and program expenses, keeping these programs free from all advertising matter. In view of high program costs, it is doubtful if the large mass of listeners would actually pay this program charge in preference to tolerating a reasonable amount of advertising in order to obtain their programs free.

The radio manufacturer who supplies the raw material and machinery for radio broadcasting is always dependent upon the broadcaster and the listener. Not only does he owe his existence to good broadcasting, a situation over which he has but little control, but also to our new

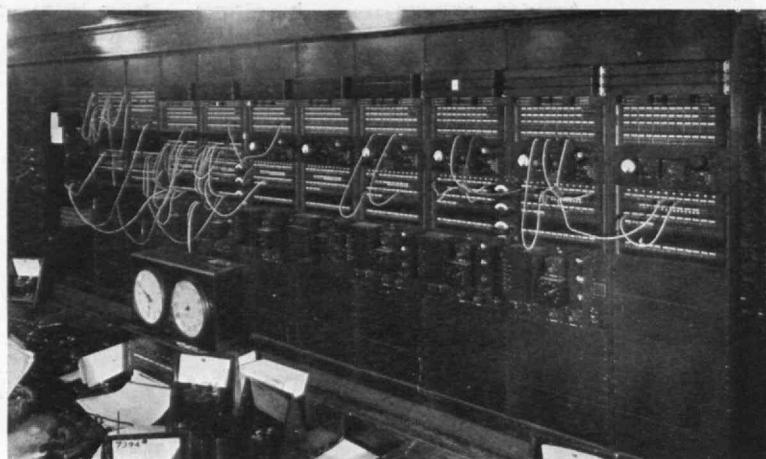


M. I. T. Photo
AN ANTENNA TOWER OF THE INSTITUTE'S
SHORT WAVE STATIONS AT ROUND HILL,
MASS.

economic status brought about through machine production. It is by producing more through machine production that the worker is able to have more, which lifts him from the condition of bare existence to one in which he is able to buy items of the luxury class, such as radio receivers. His purchases, therefore, give employment in new fields to those made idle in older fields through the efficiency of machine production. In this manner radio gives equivalent, annual full-time employment to about 130,000 persons. Since there is much part-time and seasonal work, the actual number associated with radio work is much higher than the figure given. Chain broadcasting by making necessary an extension of telephone toll circuits has also helped the employment situation. At the inauguration of President Hoover over 30,000 miles of telephone toll circuits were utilized in the radio broadcast. These circuits are of a much higher quality than the usual telephone toll circuits, because the transmission of music requires a frequency band nearly three times as wide as that necessary for satisfactory telephone conversation. The construction and maintenance of these circuits provides employment for many persons and is a true by-product of the radio industry.

IS THE growth in radio manufacturing being made at the expense of some other industry? Is the use of a radio receiver in the home eliminating that of musical instruments? Or is the dissemination of news by radio supplanting the newspaper? At first there was a real reason for raising such questions; but is there any today?

There can be no question that the novelty of music by radio at first had its harmful effects on the sale of phonographs. But phonographs are like radio; they are



N. B. C. Photo
SPEECH INPUT CONTROL PANELS IN THE CONTROL ROOM OF THE NATIONAL BROADCASTING COMPANY

not primary instruments, since they only reproduce. Today we find the radio and the phonograph combined, the one assisting and supplementing the other. My question, however, deals with primary musical instruments. Following the war, there became apparent a serious indifference toward music, both on the part of the public and on the part of musicians as well. There is today a renaissance, both in taste and interest; people who once thought Bach the proprietor of a delicatessen shop and who never heard of Brahms are beginning to know and love music. Classical themes are being hummed by day laborers, and even college students know that Palestrina was not a dancer of questionable reputation. Can there be any question as to the important part the national distribution by radio of the concerts of our greatest orchestras or the songs by great artists has had in this growing consciousness of the importance of music in America?

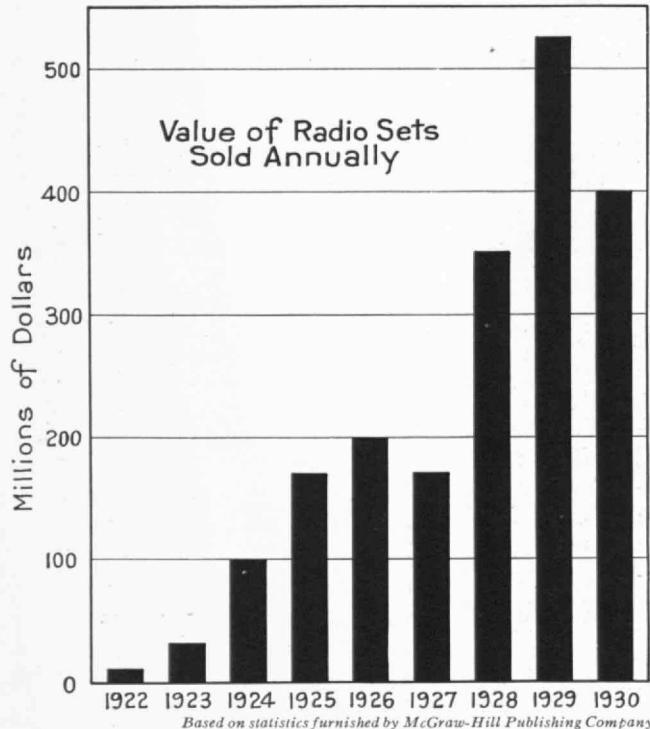
There can be no question but that the radio has replaced the special editions of newspapers as the quickest medium of broadcasting the results of special events. It is equally certain that radio broadcasting is a most important factor in making us news-conscious, and thereby exciting a desire to read the full story in the press.

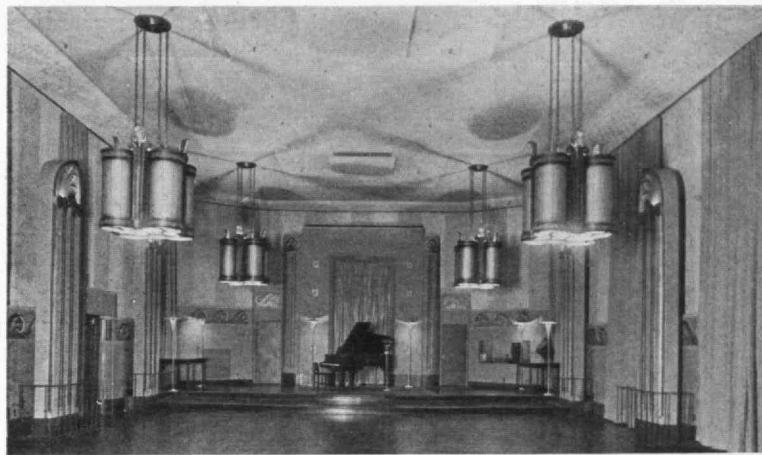
A ten-minute news summary by radio seldom covers over 1,000 words. On this basis, and with most liberal allowances for headings, it would take at least an hour to present the material of a single solid page of a metropolitan daily. No, the radio is a salesman for the newspaper, rather than its competitor.

What is obsolescence in a radio receiver? In the early days of broadcasting, advances were made so rapidly in receiver design that sets became quite useless in one or two years. Does this situation still exist? No.

What makes a set obsolete? Perhaps this could be answered by asking another question: what makes an automobile obsolete? Certainly the addition of more cylinders, spark plugs, chromium plating, or other similar embellishments to this year's car does not make last year's car ride any the less comfortably, or render it less serviceable. The new model simply represents an improvement in the art.

In a radio receiver, the operation has been reduced to single dial control for several years. From an operating point, little improvement is required. What then are the





N. B. C. Photo
THE MODERNISTIC INTERIOR OF THE NATIONAL BROADCASTING COMPANY'S LARGEST STUDIO

three points in which we should look for improvement? They are: selectivity, sensitivity, and fidelity. A radio receiver must be sufficiently selective to enable it to separate the different broadcast stations so that the programs will not be mixed within the receiver. All modern receivers have a high degree of selectivity and no radical improvement is necessary. Improvements in methods to accomplish this result are possible; but as they are only accomplishing the same result, they will not render sets obsolete. Such concatenations as Rudy Vallee crooning a love ballad along with an Amos-'n'-Andy obbligato are a thing of the past.

Sensitivities are now obtainable that were of remote speculation a few years ago. Every station that is received comes in with sufficient volume to operate the loud speaker. The sensitivity of receivers is so great that selection may be made from a wide variety of stations. With the continuous extension of excellent chain broadcasting, little is to be gained in extreme sensitivity; therefore, there is available in the present set all that is required from a sensitivity viewpoint.

Wonderful improvements have been made in the fidelity of reproduction in radio receivers. A thoroughly modern receiver handles a range of frequencies sufficient to give the equivalent of original tone quality. Only minor improvements are necessary in this direction.

With a receiver now available which, through its all-electric operation requires no attention to batteries, through its single dial or even automatic tuning requires no special skill on the part of the user, and with superb quality of reproduction, is it not foolish to believe that existing sets will become obsolete with great rapidity?

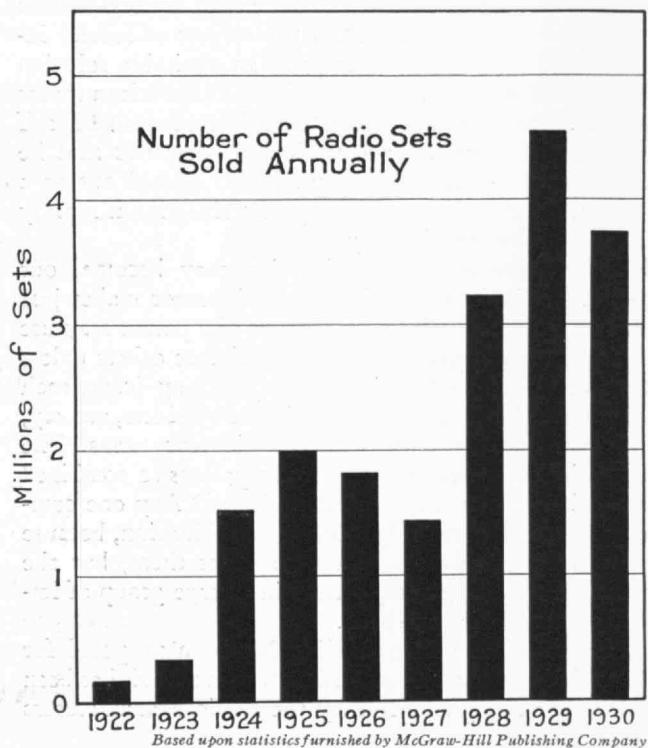
This whole problem of stability has brought a new problem to the radio manufacturer. His greatest sales in the last three years came from the replacement of obsolete sets. This market will soon be nearly closed to him, since obsolescence will become but a very small factor. He must look to the extension of the use of radio, or, as has been the case with the automobile, to the use of more than one radio in a home. This latter situation is developing with great rapidity. No longer is a single radio set sufficient for many people, but radio service is desired in various parts of the home. The simplest way to obtain such service, particularly when a variety of

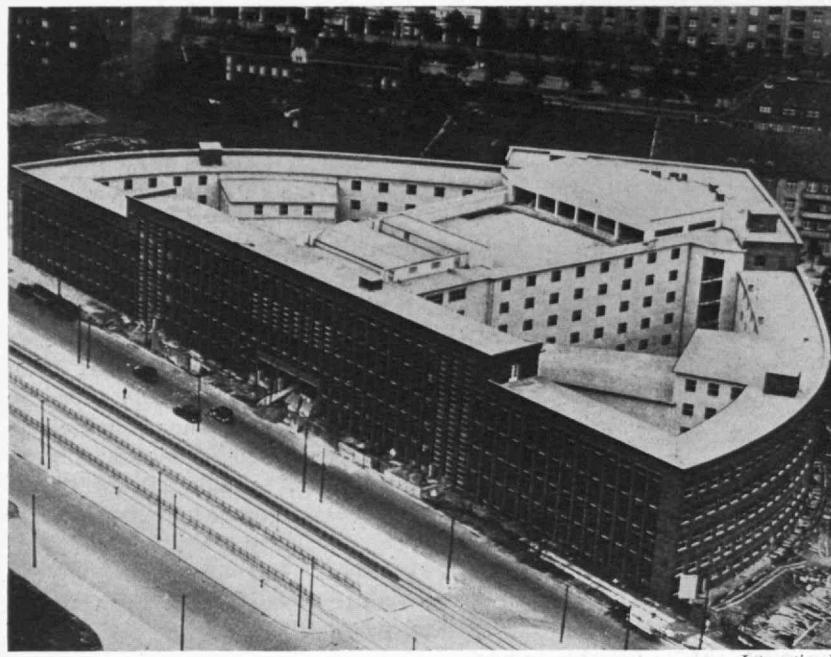
programs is desired, is through the use of more than one radio set. That this field is a most promising one is evidenced by the fact that during the current radio season fully one million of the midget or mantel-piece radio sets will be sold. A great many of these sets will be sold in homes where there is another radio receiver.

What about television? It is still quite in the experimental stage, but making excellent progress. It should, however, be remembered that this is an entirely additional feature. It is something to be added and not part of an existing receiver. It is much the same as adding talkies to the ordinary movies. It represents additional equipment, and is not merely an improvement in existing radio sets. Because of expense its use in the average home is relatively remote.

THE radio manufacturer is confronted by a patent situation without parallel in any other highly competitive industry. There are about 8,000 radio patents, the control of about half of which are in the Radio Corporation of America group. A vast number of these patents are the result of developments in the telephone field, which have now become of great importance in the radio and allied entertainment fields. Much of the radio patent litigation has been to determine whether patents issued in other fields such as that of the telephone have broad enough coverage to include radio. The bulk of the decisions have been in favor of the validity of the patents as extending to radio.

Radio is today the most litigated patent group. It has even become the subject of Congressional action. The regenerative circuit patent contested as to ownership between the American Telephone and Telegraph Company





GERMANY'S NEW RADIO CENTER, DEDICATED DECEMBER 1. BROADCASTING STUDIOS, A MUSEUM, LABORATORIES, AND GENERAL OFFICES OF THE COMMISSION ARE COMBINED IN THE CENTER

and the Westinghouse Electric and Manufacturing Company is probably the most expensive piece of litigation in patent history, exceeding the Selden patent of automobile fame. Both contestant companies are parties to the Radio Corporation agreement.

The superheterodyne patent held by the Westinghouse Company has been hotly contested as to ownership, and stands today a key patent in the radio licensing situation. The entire electrification of a radio set is dependent on another patent, the validity and ownership of which have been in contest for about two years and which appears to be far from settled. Any patent group issuing licenses may suddenly find themselves the subject of federal investigation, and every attempt at an equitable solution has so far failed; there still remains the Damoclean threat of litigation. The independent manufacturer finds himself loaded with royalties and with daily demands that he take licenses from new groups. Radio started out as a most democratic industry. The patent situation is rapidly forcing it into an oligarchy.

Unfortunate as such a situation may become, our patent law in its protection to the inventor makes just such situations possible. The owner of a patent may use it for his own benefit. He need not license others unless he so desires. A group of patent holders may license each other under favorable terms and license outsiders, namely, their competitors under entirely different terms. The real point of contest is whether the patents so combined are valid — have they been adjudicated? Any one company is seldom able to fight a large combination, because not only are the financial odds against them, but the chance of upsetting every patent in a large group of important patents is nearly nil.

As a solution, patent pooling has been proposed for the radio industry, and much constructive work has been undertaken along this line by the Radio Manufacturers Association.

STANDING as it does as the guardian of the public interest in radio matters, the Federal Radio Commission has had a most difficult position. The administration of its affairs in the public interest should be based on engineering and legal considerations, modified as is necessary by the economic aspects. It, however, has been forced to take a stand in many matters as a direct result of politics, rather than as the result of engineering or legal data. This has been brought about quite largely through the expected lack of understanding of radio engineering principles on the part of the members of Congress.

General Saltzman, the Chairman of the Federal Radio Commission, recently stated: "Of all the utilities used by the people on this earth, radio is probably the one most difficult to regulate. Owing to the fact that these radio waves travel in every direction, if you are to regard state limits, it makes more than national regulation necessary. A fifteen-year old boy, fooling with an amateur short wave

on his father's farm in Iowa may interfere with a land station in South Africa. German ships, coming over to our shores, with wave lengths assigned by the German government, must not interfere with our land stations. Cuban stations must not interfere with Mexican land stations. American airplanes, flying over the border into Canada and Mexico, must be able with the frequency assigned by our government to communicate with stations in those countries."

The Federal Radio Commission was set up and its duties prescribed by an Act of Congress, approved February 23, 1927. There have been some amendments pertaining to the set-up of the Commission itself, but only one important amendment pertaining to the administration of radio facilities. This is the Davis Amendment, which has been such a problem to the Commission.

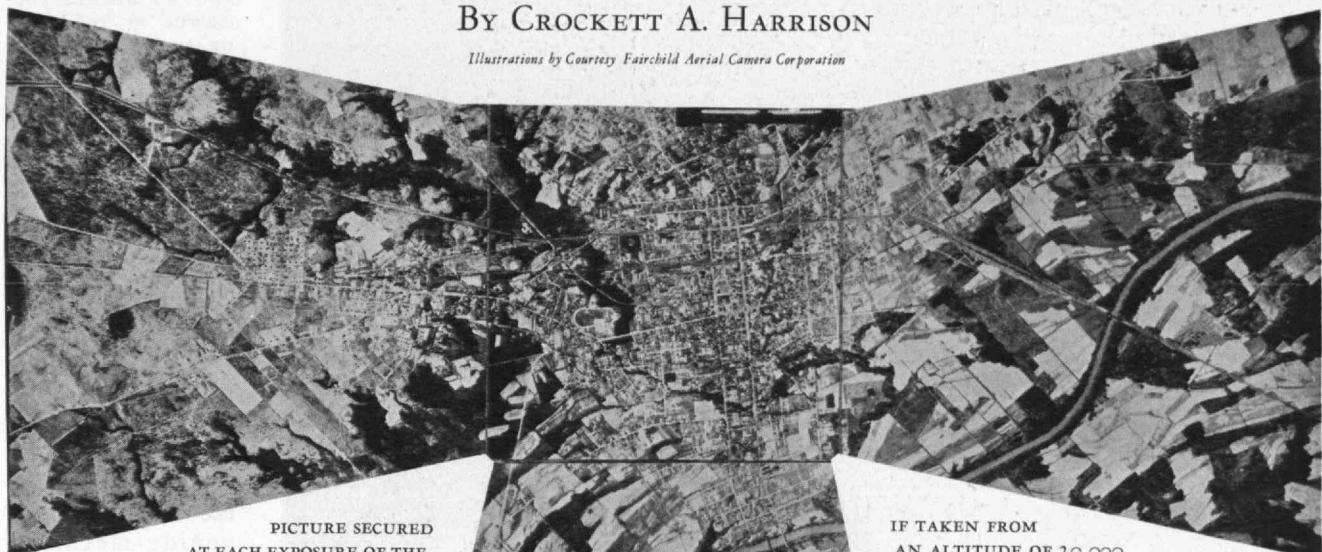
It was the intent of Congress to provide equal radio facilities throughout the country. To assist in carrying out their desires and the administration of radio matters, the country was divided into five zones. These were zones used in another grouping quite remote from radio. They are wholly unadapted to radio services. In its provision that each zone should have equal transmission facilities, it utterly failed to take into consideration that the fifth zone is eight times as large as the first zone. These zones are somewhat based on population, but unfortunately, radio waves do not radiate in proportion to the population. Distance and topography are the important factors.

Congress felt that the Radio Commission did not carry out its desire for equal radio facilities as expeditiously as should have been done. To force them to take action, Congress passed in 1928 an amendment to the Radio Act, known as the Davis Amendment. This amendment prescribes that radio facilities shall be divided among the states of each zone on a general basis of population. Again this Act of (*Continued on page 152*)

MAKING MAPS FROM THE AIR

BY CROCKETT A. HARRISON

Illustrations by Courtesy Fairchild Aerial Camera Corporation

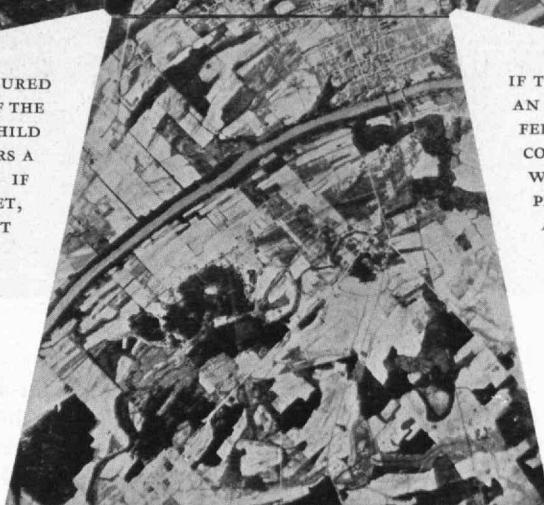


PICTURE SECURED
AT EACH EXPOSURE OF THE
FOUR-LENS BAGLEY TYPE FAIRCHILD
CAMERA. EACH COMPOSITE VIEW COVERS A
GROUND AREA OF 15.3 SQUARE MILES IF
TAKEN AT AN ELEVATION OF 10,000 FEET,
AND 43 SQUARE MILES FROM 15,000 FEET

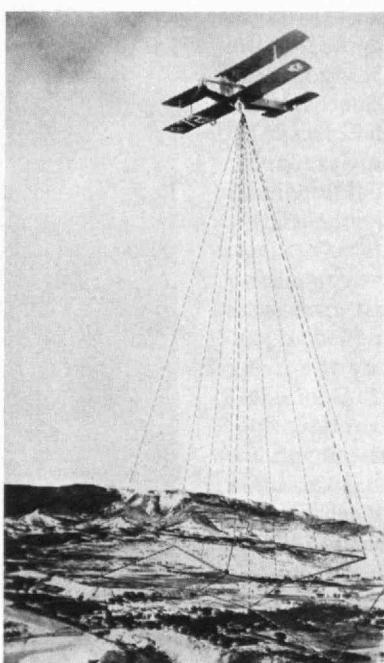
CARTOGRAPHERS have become photographers and surveyors have taken to the air. Yet the ordinary citizen (and many who are technically trained as well), while nodding hearty approval to aerial surveying and mapping as an abstract idea with great possibilities, knows but little of the technique of the art. He possesses no real conception of the extensiveness of its use today, nor is he aware of its growing value for the prosecution of manifold human enterprises.

One may confine a discussion of the progress in photographic surveying from airplanes to the decade of 1920-1930 and still include most of the significant steps by which this exceedingly useful art has emerged from the chaos of its initial stages, although this decade does not include certain pioneer feats such as the air survey of Flanders and Picardy by the British in 1916-1917.

As a method of making maps to plan high tension power and transmission lines without arousing the suspicion of landowners that a right-of-way was being contemplated, the air survey method made its earliest appeal and, up to 1924, about 25 corporations had availed themselves of it for such a



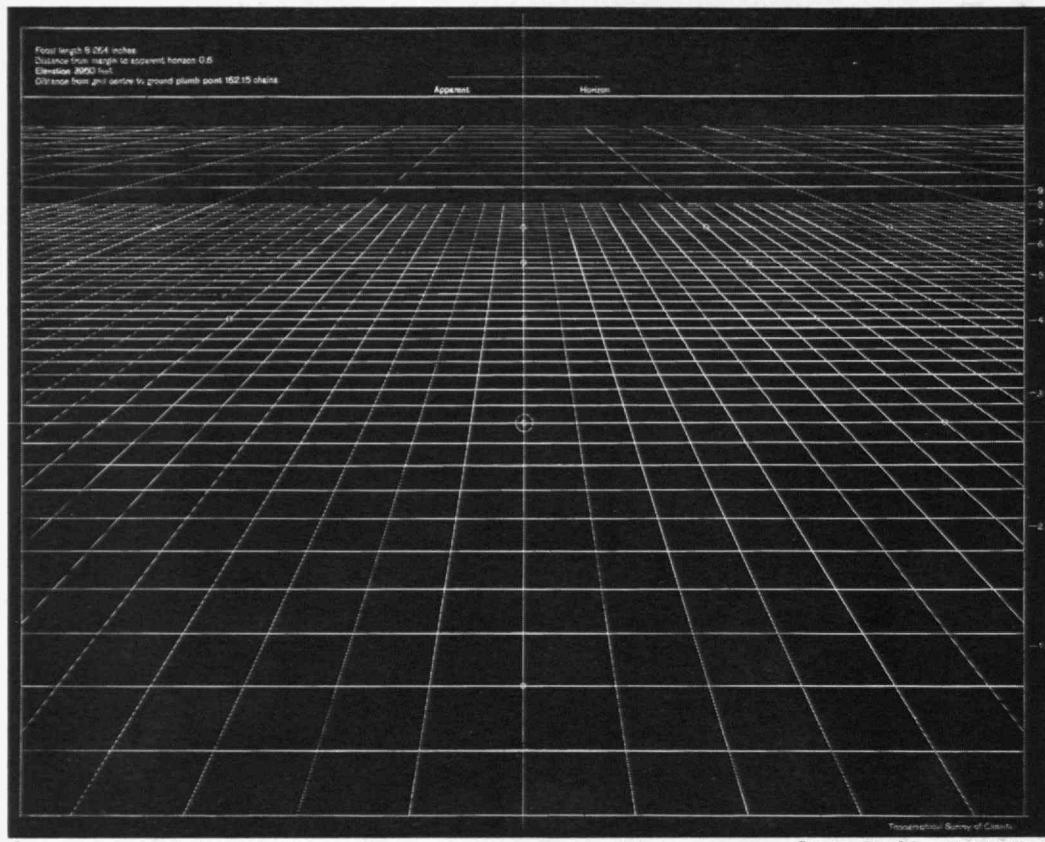
BELOW: SHOWING HOW THE DIFFERENT CHAMBERS OF THE
T-2 AERIAL CAMERA COVER THE AREA BEING PHOTO-
GRAPHED



IF TAKEN FROM
AN ALTITUDE OF 20,000
FEET, 74 SQUARE MILES WOULD BE
COVERED. THE CAPACITY OF THIS CAMERA
WHEN LOADED WITH FILM IS SUFFICIENT TO
PHOTOGRAPH THOROUGHLY A GROSS STRIP
AREA OF 800 SQUARE MILES FROM AN ELE-
VATION OF 10,000 FEET

purpose. Meanwhile it was being tried successfully for reservoir surveys, early examples being the mapping of 500 square miles of the Tallapoosa River Valley in 1923 for the Alabama Power Company under the direction of its chief engineer, Oscar G. Thurlow, '04; a 2,000 square-mile survey of the Tennessee River Valley by the War Department at about the same time; for harbor mapping at Mobile, New Orleans, and Boston; for city maps to aid in traffic studies, for taxation purposes, for landscaping of parks and parkways, and in formulating zoning determinations.

Kansas City, Newark, and New York were among the first municipalities to use it. Two air maps of New York (400 square miles on a 600-foot scale and a "Regional" one covering 625 square miles on a 2,000-foot scale) were ordered July 10, 1923, and delivered by April 15, 1924. The year 1924 also saw the demonstration of a camera by which, on May 2, Lieutenants Macready and Stevens of the Army Air Corps were enabled to make a photograph of Dayton, Ohio, from an altitude of 32,220 feet. This single photographic print showed an area of 19 square miles! A few years later Stevens flying with the stunting ace of



GRID USED IN MAPPING OBLIQUE PHOTOGRAPHS. THIS SYSTEM HAS BEEN PROVED HIGHLY SUCCESSFUL BY THE TOPOGRAPHICAL SURVEY OF CANADA

channel conditions and flooding from the river's overflow, the planning of levees to protect the adjacent and very fertile Imperial Valley was made possible without the hardships, enormous expense, and delay incident to the use of ground surveying methods. Similarly, aerial photography was invoked by the Survey of India to map the swamps and forests of the Irrawaddy Delta.

It is a far cry from

these not-so-old but nevertheless pioneer accomplishments to the present-day possibilities. Now, for practical purposes, we stand at the close of the first ten years of the history of aerial photography in surveying and find under way stupendous air-mapping programs which less than five years ago would have seemed fantastic.

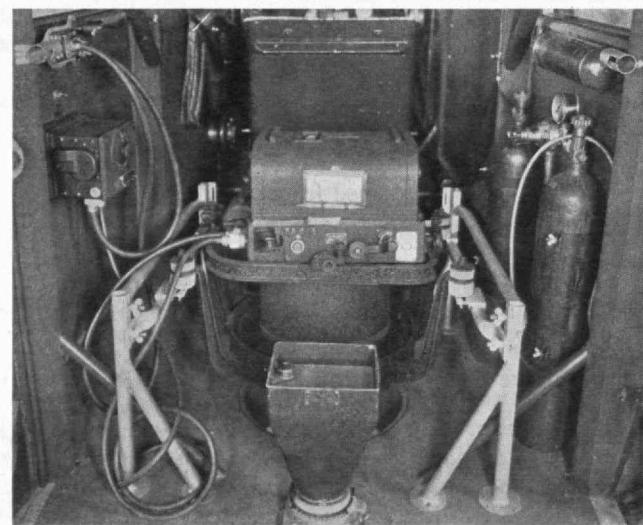
Begun a year ago, as recorded in *The Review* for December, 1929, this winter's five-month schedule calls for the photographing of an additional 9,000 square miles of the lower Mississippi Basin for flood control studies. Contracts for this were let by the War Department last October to the Curtiss-Wright Flying Service which will use

the Army Air Corps, Capt. James H. Doolittle, S.M. '24, reached an altitude in excess of 37,000 feet. A series of perfect photographs were made in spite of an approximate temperature of -70° F. and the seven odd miles of intervening atmosphere.

In sparsely settled areas as well as congested centers it was readily apparent that mapping could be expedited by aerial photography, especially in regions where difficulties of the terrain, climate, absence of water, and transport impeded the progress of land parties. The aerial method in such regions literally surmounted the hitherto arduous task of getting over the ground imposed by the presence of high mountain ranges, deep canyons and desert wastelands encountered in the Southwestern United States, and by the countless lakes and practically impenetrable muskeg swamps of Canada. In Canada, air maps as a means of estimating stumpage, quickly pointed the way to the supersession of the old-time timber cruiser.

Governmental agencies concerned with completing geological and topographical surveys of vast areas were quite receptive to the new method. During 1924, 11,500 square miles in Texas alone were covered by the Army Air Corps coöperating with the United States Geological Survey, and the outgrowth of early experimental work in Canada has resulted, up to the end of 1929, in photographing 339,075 square miles by the Royal Canadian Air Force for the use of the Topographical Surveys Branch and other governmental departments of the Dominion.

An early example of its use for flood control studies is found in the airmap of 325 square miles of the Colorado River Delta. There, in a territory subject to shifting

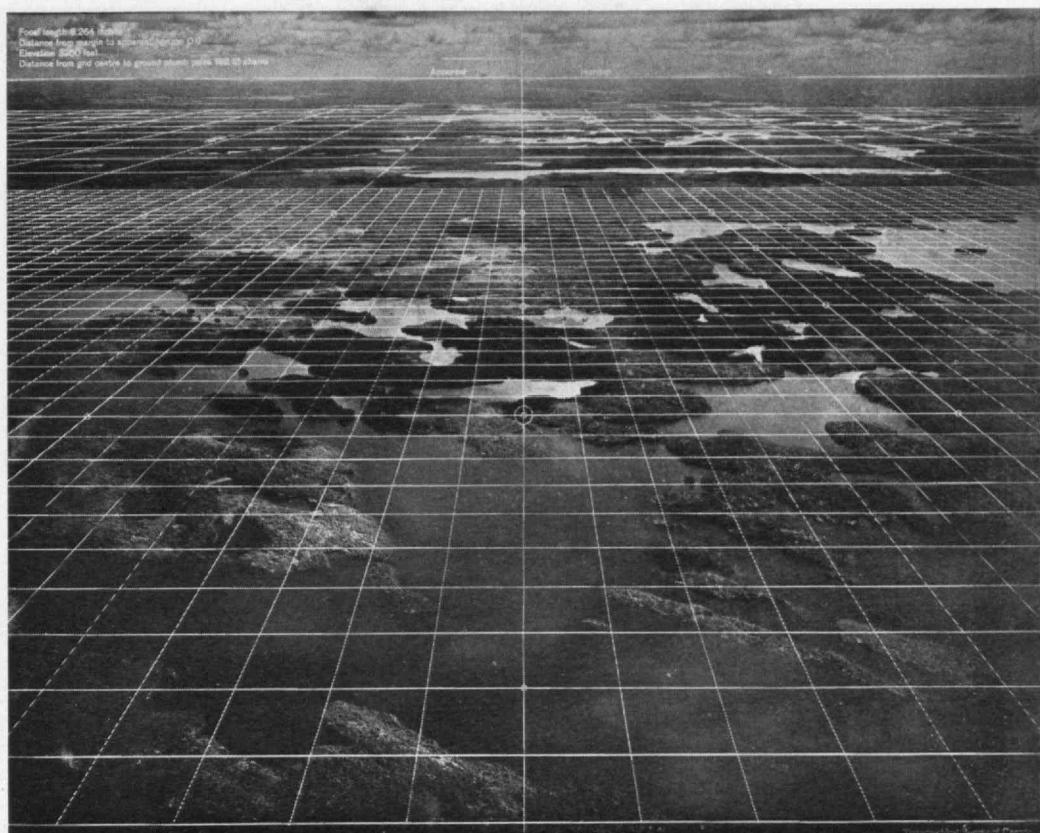


U. S. Army Air Corps Photo
FAIRCHILD AUTOMATIC MAPPING CAMERA MOUNTED IN FAIRCHILD CABIN MONOPLANE

OBLIQUE AERIAL PHOTOGRAPH WITH THE GRID SHOWN ON OPPOSITE PAGE IN POSITION—A METHOD DEVELOPED IN CANADA

five planes to make the 14,000 exposures necessary. To keep under the allowable one per cent error limit, these planes must fly constantly within a ten-foot range of a 12,400-foot altitude. But, as this cannot always be accomplished, even with the finest piloting aided by the sensitive new-type Paulin altimeters, it will probably be necessary to enlarge or reduce most of the 56,000 photographs to scale, thus illustrating one of

the factors which still make for high production costs in aerial surveying. Besides the work in the lower-Mississippi Basin, Fairchild Aerial Surveys are at present engaged in mapping the Missouri Basin from the mouth of the river to Yankton, South Dakota, and another organization is mapping extensive areas in the Ohio Valley. The Missouri River project includes approximately 2,500 square miles and the Ohio River project approximately 1,000 square miles. Probably the largest strictly commercial undertaking of the past season was a continuous strip map two miles wide extending from the Texas Panhandle to Chicago, a distance of approximately 1,000



Courtesy Royal Canadian Air Force

miles. The survey was made for the construction of a natural gas pipeline and the entire field work was completed in less than 60 days. Lloyd M. Long, '23, of the Dallas office of Fairchild Aerial Surveys directed operations.

An African citation is afforded by the Aircraft Operating Company, Ltd., a British concern, which last month announced the completion of the photographic work on an air survey of Northern Rhodesia. Flying at elevations of about 21,000 feet, a total of 15,000 photographs were taken of open country in addition to 700 of several townships. In four months data was obtained which, with ordinary ground survey methods, would have required eight years. Parenthetically, this company during last year completed, or had under contract and incompletely at the end of 1929, 88,000 square miles of surveying.

Progress such as indicated above has come about not alone because the idea of aerial surveying made an early appeal and proved itself practical in trials on a small scale, but because of the marked improvement in cameras, photographic airplanes and other equipment, and because, from the accumulated experience of map-makers, there have been evolved recognized standards of practice.



U. S. Navy Photo
PERSONNEL AND EQUIPMENT OF THE U. S. NAVY ALASKAN SURVEY EXPEDITION IN 1929

IN ITS simplest form in the United States, making a map by means of aerial photographs is accomplished by assembling them into a mosaic. A camera is installed in a plane with the lens pointing downward through a hole in the bottom of the plane. Upon an available quadrangle map of the U. S. Geological Survey, or other suitable existing map, the area to be covered is noted and "guide of flight" lines determined. The altitude at which the plane should fly is obtained as follows: If the area in question is to be mapped at a scale of 1 inch equals 800 feet



Courtesy Royal Canadian Air Force

SHOWING RELATIVE AREAS MAPPED BY OBLIQUE AND VERTICAL METHODS. THE OBLIQUE METHOD IS MOST PRACTICAL WHERE THERE ARE LARGE AREAS OF FLAT COUNTRY

and a 12-inch lens is to be used, multiplication of the two factors (800×12 equals 9,600) gives the altitude in feet which the plane must maintain.

In making an actual survey, the pilot flies along the "guide of flight" lines, back and forth, forming "strips" until the entire area has been photographically covered. The consecutive exposures are timed so that they overlap each other like shingles by about 60% and the "guide of flight" lines are spaced so that the strips overlap each other by about 50%. This overlap makes it possible to use only the central portion of each photograph which alone is in true vertical projection; the overlap moreover, allows stereoscopic study of the terrain, which adds the third dimension, or perspective, to any portion of the ground covered.

After the photographs are developed the scale ratio of each print is carefully figured, checking to known distances on the equivalent terrain. Any inaccuracies of scale are corrected by this ratio figuring and then each print is rephotographed to a common accurate scale. The central portions of these corrected photographs are assembled into a "mosaic" of the terrain covered, triangulation points, highway and railway maps, and data from

field notes being used as "controls." A negative of the "mosaic" itself is then made and from prints of this negative are produced copies of the finished air map.

Cameras are now available which register automatically the year, month, day, hour, minute, and second a photograph is taken; the level condition of the camera; the altitude; number of the exposure and the focal length of the lens on each photographic negative. An intervalometer provides for automatically tripping the camera shutter at a predetermined interval which is exactly right to secure the necessary overlap of a photograph on the one preceding. The recording feature is seldom incorporated on aerial cameras for commercial use, but the automatic operation feature is extensively used. It is in military operation that the recording camera is valuable. A pilot with such an instrument installed in a fast pursuit airplane can fly at extremely high altitudes and a great speed to map an extensive area without the help of a camera operator. Every photograph will contain a record of the data previously mentioned.

But the field of view of each picture made by the usual single lens mapping camera covers only a restricted area. For instance, a single lens camera (Continued on page 149)

THE ANATOMY OF X-RAYS

New Uses for the Rays, the Wave-Length of Which Approximates the Diameter of an Atom

BY KARL T. COMPTON

ONE of the latest of the long succession of modern miracles of science is the discovery that x-rays can be used to hasten the process of evolution — that process regarding which scientific evidence has for so long been in conflict with superstitions and prejudices. The new discovery is this: if a germinating seedling be exposed to strong x-rays, there is a considerable chance that it may develop into a new species, bearing perhaps little resemblance to its parent stock and capable of reproduction and self-perpetuation. For example, ordinary tobacco plants thus treated by x-rays gave rise to species of dwarf and to giant plants, twelve feet tall. Similarly flies, so exposed to x-rays, occasionally have offspring with strange characteristics. Similar, though less frequent, results can be produced with gamma rays of radium, which are rather similar to x-rays.

Here then is a modern miracle: by means of x-rays it appears possible to a certain extent to produce in the laboratory some of those changes which have been assumed in the theory of evolution, and there is, indeed, reason for suspecting that many of the new species which geology records in past ages, arose in this way as the result of the x-ray-like gamma rays from the radium which is always present in a slight amount in the earth. It appears quite possible, for example, that by this means new types of plants may be produced which will be of great value in agriculture.

But this is only one example of what x-rays can do. It is well known how they can pass through the body, or other objects which are opaque to ordinary light, and produce on a photographic plate or on a fluorescent screen a picture of the hidden insides of the body through which they have passed. This use of x-rays has entirely revolutionized diagnostic medicine, and is of industrial importance in detecting flaws in welded metal joints, castings, armor plate, and so forth. It is also well known that x-rays are valuable therapeutic agents in the treatment of certain diseases such as cancer.

To the chemist and physicist, x-rays have been a wonderful servant, for they have enabled him to count the electrons in an atom and to study the ways in which atoms are arranged in molecules or in crystals. In fact it is almost true that all we know about the insides of atoms has been learned by the aid of x-rays.

HAVING been told of these things which have been accomplished by use of x-rays, I can imagine the layman asking, "Just what are x-rays, anyway?" In fact, that was the very first question which was asked about them when they were discovered in 1898, and for more than a dozen years no one could give a definite answer. For that very reason they were called *x*-rays, the *x* being the symbol of an "unknown quantity." About all that

was known about them was that they traveled in straight lines, that they had great penetrating power, that they could affect a photographic or fluorescent plate, and that they were able to destroy the electrical insulating property of air or other gases.

Now it is known that x-rays are really like radio waves or light waves. Whereas a radio wave has a wave length of several hundred feet, and a light wave has a wave length of about ten-thousandth of an inch, x-rays have wave lengths of about a hundred millionth of an inch. In fact the wave length of an x-ray is about as long as the diameter of an atom, and to this fact it owes its peculiar properties.

The discovery of x-rays is one of the most interesting stories in modern physics. Back in the 1890's, physicists were much excited in investigating those peculiar and striking phenomena which occur when electricity at a fairly high voltage is impressed on the ends of a glass tube containing rarefied gas. Imagine a long glass tube, with a metal wire inserted into each end, and containing gas which may be pumped out by some kind of vacuum pump. If the gas pressure is varied while the voltage is maintained impressed upon the wire electrodes at the ends of the tube, a whole succession of surprising and spectacular occurrences are observable. If we start with a tube full of gas at atmospheric pressure and slowly pump out the gas, there is at first nothing observed, since the gas is a good insulator and the voltage is insufficient to break down this insulation and force an electric current through the gas. If the gas is gradually pumped out of the tube, however, a certain degree of rarefaction will be reached at which a spark passes the length of the tube, and with slightly increased rarefaction the tube is filled with a long, thin, wavy, luminous streamer marking the region in the gas through which the electric current is passing. As the vacuum becomes still better with further pumping, the current through the gas increases rapidly and this streamer expands until the whole tube is filled with a brilliant glow.

At this stage the tube is nothing more nor less than an example of those street sign lighting tubes of neon, mercury vapor, or other gas which now adorn our city streets at night. As still more gas is pumped out, this luminous glow breaks up into well defined regions separated by dark spaces, — some of these regions occurring with a surprising regularity along the tube as alternate light and dark striations. These various luminous regions may be of different colors, and they behave quite differently as still more gas is pumped out of the tube, since the luminous striations move toward the electrically positive end of the tube and there disappear, while a fainter glow from the negative end of the tube gradually expands until it alone fills the entire tube.

From this stage on it becomes more and more difficult to force the electricity through the tube, since the currents become smaller and the requisite voltage becomes higher, — and at the same time the glass walls, particularly near the negative end, begin to glow with a greenish fluorescence. With modern vacuum pumps the air can be pumped out of these tubes until the luminosity of the gas has become too faint to be detected by the eye, whereas the glass walls of the tube now glow brilliantly with the green fluorescent light. Finally, at really high vacuum, the whole process ceases, since a perfect vacuum is, of course, a perfect insulator. Is it any wonder that scientists 40 years ago were fascinated by these phenomena and, failing to explain them spoke of the existence of a "fourth state of matter" in these evacuated discharge tubes?

AT THIS point I will relate the course of two experiments, both performed a little over 30 years ago by scientists of high ability, both starting out with the same objective, the one leading to no great result, the other leading to an epoch-making discovery — the difference between them being due to the difference in attitude of the two men toward an unexpected complication.

Sir William Crookes having at his disposal an improved vacuum pump was investigating the phenomena described above in the stage of high exhaustion when the glass walls of the tube glowed with green fluorescence, and for the purposes of record he attempted to obtain photographs of the tube under its various conditions of operation. He was greatly annoyed to find that his entire batch of photographic plates had become light-struck and were worthless. He secured a new batch of photographic plates and made another attempt, and these plates also quickly became light-struck. He finally, however, solved the difficulty successfully by moving his supply of photographic plates into a neighboring room, after which he had no further trouble and proceeded successfully with the experiment which he had set out to perform.

During the same year the German scientist, Wilhelm Konrad Röntgen, was also undertaking the same study and attempting to photograph the glowing tube under various conditions of operation. He also found that his photographic plates became light-struck, but, instead of avoiding this by moving his plates into another room, he set about to investigate the reason for this fogging of his plates, and traced it to the existence of very penetrating invisible radiations emanating from the discharge tube when under the condition of greenish fluorescence existing when the tube was in a very high state of exhaustion. Thus, by accident, were discovered the Röntgen rays, more commonly nowadays called x-rays. This was just a couple of years prior to the discovery of electrons, which also followed from the attempts of Sir J. J. Thomson and others to explain the phenomena in these electric discharge tubes containing rarefied gases which I have described above. Then it was immediately suggested that the x-rays were, in fact, radiations produced by the bombardment of the glass walls or of any solid target by high speed electrons, much as sound radiation is produced when a bullet strikes a target. This suggestion has since been abundantly verified.

I suppose there have never been any two discoveries in science which were so quickly seized upon all over the world and which so quickly revolutionized man's ideas regarding the structure of matter as these two, the discovery of electrons and the discovery of x-rays. If one looks over the bibliographies of that period one may be puzzled to note that even in the United States there were published x-ray photographs through various parts of the human body and there were inventions of improved forms of x-ray tubes appearing even before the publication of Röntgen's great article describing his own discovery. This is due to the fact that Röntgen first announced his discovery to a small medical society, and the news of that announcement quickly spread through the scientific world, but his publication in a leading scientific journal was delayed for more than a year. At any rate within two or three years, around 1900, the x-ray tube had been developed to a passably satisfactory state as a practical device for medical and scientific work. These early x-ray tubes were simply geometrical modifications of the early gas discharge tubes in which the x-rays had been discovered. They produced good x-rays but were erratic in their behavior, owing principally to the fact that the amount of gas in the tube changed during and between operations.

THE next stage of development which brings the x-ray tube essentially to its present highly efficient state, is very closely bound up with a simultaneous and similar development of the radio tube, both being applications of the phenomenon of evaporation of negative electricity, in the form of electrons, out of hot metals, a phenomenon which had been first clearly understood and investigated by Richardson in about 1904, and which has even up to the present time been one of the most active fields of scientific and industrial research. The particular development of the x-ray tube came from a realization by William D. Coolidge, '96, of the General Electric Company, that with the aid of a hot filament to supply a current of electrons, and with the aid of improved methods of securing high vacua which he and his colleagues had developed, there arose the possibility of doing away entirely with the gas in an x-ray tube as an agent to convey the electricity through it, and of producing x-rays directly by simply bombarding a metal target with electrons which had been evaporated out of a neighboring hot filament and then directed swiftly toward the target by the high voltage applied to the x-ray tube. Thus was designed the modern Coolidge x-ray tube which is in practically universal use.

While I was a research student in Princeton in 1911 Professor Richardson, who was in charge of my work, came very near to making the discovery that x-rays are wave radiations similar to light but of much shorter wave length, and had he done so he would have anticipated the first proof of the wave nature of x-rays by von Laue, Friedrich and Knipping about a year later. Richardson knew that if x-rays were like light waves it should be possible to refract them with the aid of a prism. Certain reasons led him to the idea that a prism of iron might be particularly suitable, and so he carried out extensive experiments in an attempt to refract a beam of x-rays by passing it through the edge of a (*Concluded on page 158*)

AMERIKANISMUS

In Germany an Engineer Learns the Truth about Americans

BY HUNTER ROUSE

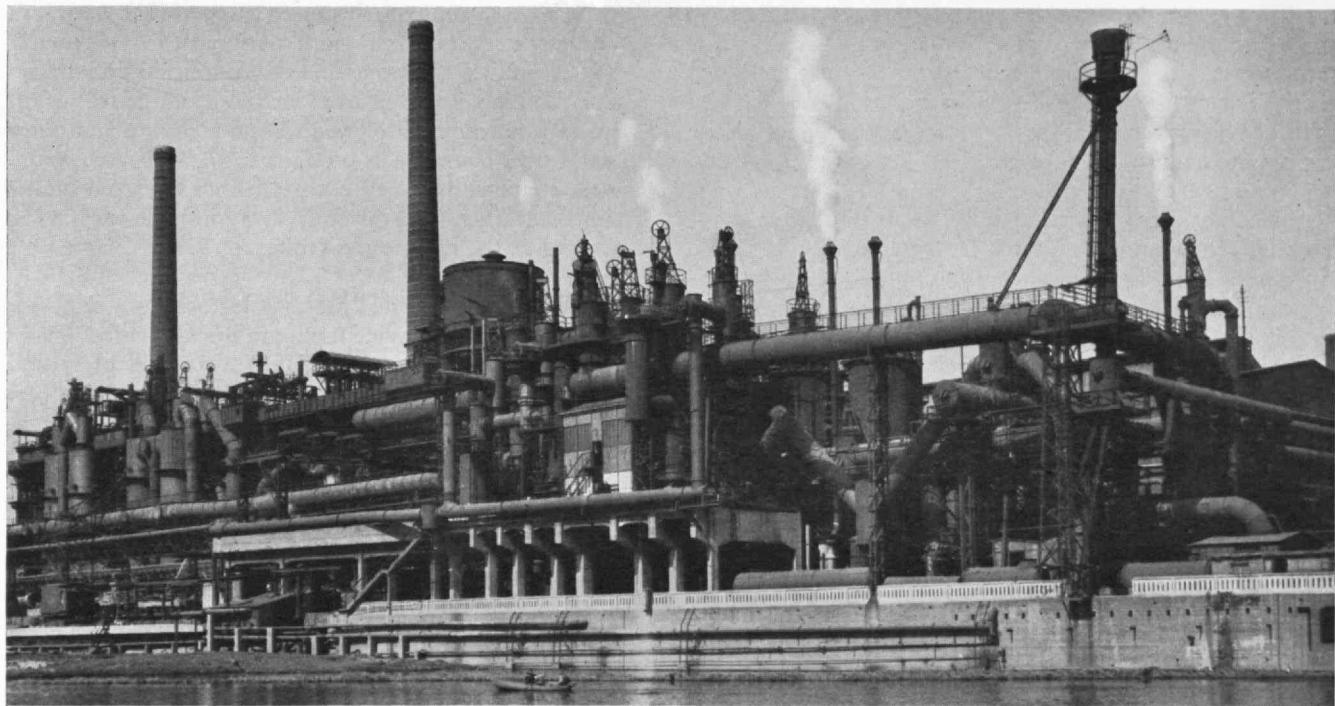
LIESL, the German *Zimmermädchen* who cares for my room, just came in to turn down the bed-covers, lay out my pajamas, and wish me a good night's rest. The sudden question, "Liesl, what do you think of America?" rather took her unawares, accustomed as she is to my ungrammatical inquiry as to the next day's weather, but she must have caught my meaning, for her reply was exactly what I sought. "America is a land of money and money-chasing people; I'd like to work there — but live in Germany." That is the *Amerikanismus* concept in its simplest, commonest form.

We "money-chasers" are surely the most highly blessed race of all the world insofar as gratis criticism is concerned. From the native magazine writer, to the self-exiled American in permanent residence on the continent who sends his opinions home for publication — not to mention the European who is prolific in his statements after a four-day tour of the States — everyone who has a single thought on the matter gives it freely, till the burden of analyzed error would seem almost more than any shoulder could bear. But we are either inherently thick-skinned or so toughened by experience that we seldom bother even to smile tolerantly. To be sure, we have solved very easily and typically this problem of unending censure, but with it we have lost in large measure the ability to listen when some view of actual worth is presented — to distinguish valuable comment from sheer headline flourish.

A foreign country offers the most promising field for search; but just as one must go alone and live the life of the country to learn that country's life, so must one do to learn that country's genuine thoughts about our land of wealth and promise across the seas. A year of study as a hydraulic engineer in a different world has surely given me a new outlook upon American civilization — that is inevitable and entirely a self-contained process — but through the eyes of the German people has come a keener comprehension of the life we are wont to live.

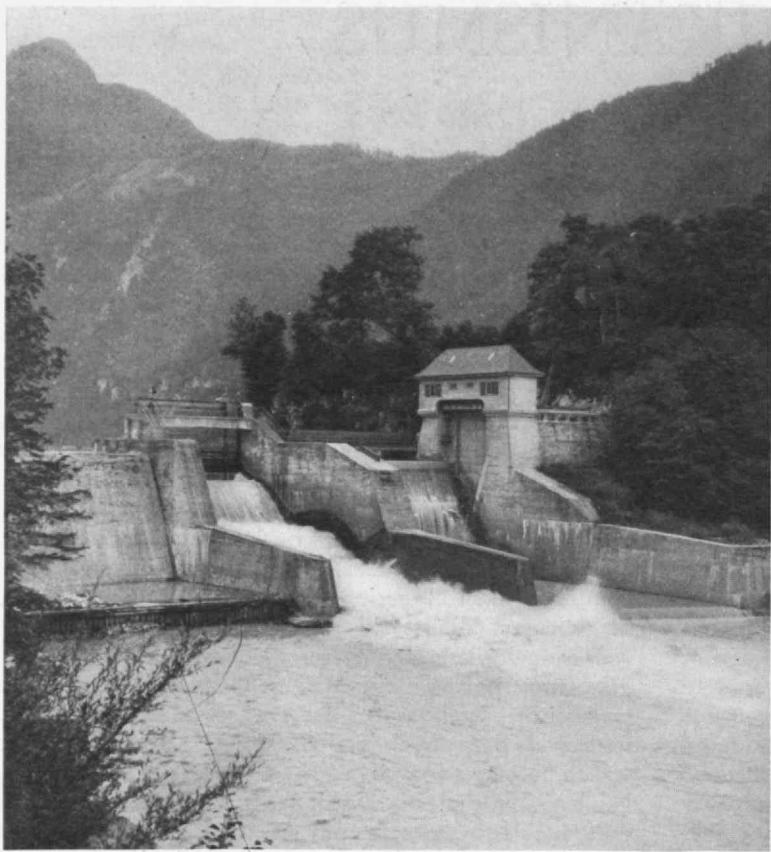
To understand the German outlook, one must consider for a moment or so under just what conditions the German mind has to function. Twenty years ago the empire had reached almost the pinnacle of world prestige — *Kultur*, colonies, manufacture, education, science, engineering, the arts — in all these Germany held avowed leadership, with only one or two other powers who were her equal. She developed a national pride which became a byword to her people, literally a propaganda. Then came the Great War; who was to blame is quite beside the point; surely not the *Volk*, for when one listens to the serious comment of those who lived through the crisis, one even begins to question the Allied doctrines the slightest trifle!

Through Versailles, political revolution, inflation of currency, a decade and more of reparations payment with tremendous taxation and millions of inhabitants without employment, the country has been reduced to almost a



GERMAN STEEL WORKS AT MULHEIM, RUHR VALLEY

Galloway



Galloway

GERMAN HYDRO-ELECTRIC PLANT ON SALACH RIVER IN BAVARIA, SOUTH OF REICHENHALL. GERMANY IS WORKING HARD TO DEVELOP HER VAST WATER RESOURCES. LONG THE CENTER OF HYDRAULIC RESEARCH, SHE IS ESPECIALLY APT IN THIS FIELD. IT WAS THIS FACT WHICH TOOK THE AUTHOR OF THE ACCOMPANYING ARTICLE OVER THERE TO WORK AND STUDY IN THE GREAT HYDRAULIC LABORATORIES. AMERICA IS FAST REALIZING THE VALUE OF THIS WORK

shadow of the old empire. True, the people are the same, and their pride can never be conquered, be it the result of habit or genuine belief. But with empty purses, compulsory taxes that make accumulation utterly impossible, is it little wonder that the *Volk*, whether of Liesl's class or the comparatively well-to-do, look upon the neighbor across the ocean with a feeling ranging between envy and bitterness?

Simultaneous with this purely financial change came further alterations, each with its own peculiar influence upon the German mind and vision. The "Made in Germany" regime is at such a stand that American products are now widely used in Germany, and American enterprises are controlling many a German firm. Previous military stiffness is being rapidly superseded by a prevalent turn to gymnastic and competitive sport. The morals of the post-war generation have made an almost radical departure from the old-age decorum, with an accompanying freedom and naturalness that would abash even an American. And the experiment with smoothness and efficiency in republican rule has made a heated politician out of the most taciturn citizen of former years. All these points must one bear in mind if one will weight the German views to their true intrinsic worth.

Liesl gave us the *Amerikanismus* concept in its basic state. Let us advance a step to the group gathered perforce for the evening meal in a Münchener Pension, the

most assorted collection of average human beings one could wish. The elderly *Pensionsmutter*, a hearty Royalist with a portrait of the ex-Kaiser above her bed, is a fair specimen of her order. She likes Americans on the whole, in spite of a resigned tolerance for their obvious poor breeding, for they pay well and are not so class-conscious as others, and she has fallen in love with each male guest in turn for countless years. Next in importance comes the equally elderly *Northgerman* spinster, who has spent a good two decades teaching languages in England, and returned to Germany with the typical English aloofness toward all things savoring of the American. (This, it must be noted, seems to be passed on to every student of the "real" English language on the continent.) But she is surprisingly well informed on all that exists on the other side — so well that she was once bluntly enlightened upon the sundry points in which an American considered her the most in error, and behold, in this former proudest of the proud of the old continental *Kultur* we now have a staunch supporter of the tremendous vitality and youth that exists in the new world.

From there we may pass on to the four or five young girl students, for the most part excellent sketches of the new generation (to our Lindsey is attributed this metamorphosis), with a lone example of the inexperienced pre-war type. The others are of every sort: an army officer or so at times, artists and students of several nationalities, and the general flow of two-day guests. Dinner-table conversation is generally lively enough with the *Northgerman*

spinster at the helm and a Norwegian pessimist to spur her on; after an amused allusion to this and that American weakness, it takes a fairly international turn, especially when the unlikely happens and the Americans present can speak the language. But once let the room be free of all visitors from the land of wealth and promise, and not a fault of ours but what is brought to light, beaten, pummeled, stripped naked of excuses before the grim multitude — and then filed carefully away in memories, to be reviewed at the next round-table.

RECENTLY I attended a travel lecture by a professor who has world-wide repute in his field, after one of his trips through the States. He is a member of several American professional societies, follower of the best American engineering journals, and never hesitates to make friends with Americans who chance his way. However, this lecture was for the Germans, and consisted principally of pointed jokes at the expense of American fallacies and the proof that without German brains, American wealth would be useless. It is what the *Volk* seem to want, and it is only natural that he, as a popular figure, would give it to them.

Newspapers and magazines follow much the same trend: cartoons of the brain-pocketbook alliance, and ever-recurring citation of the case of this and that German scientist or engineer who designed (*Continued on page 160*)



THE TREND OF AFFAIRS



A Sermon on Glass

ALTHOUGH the glass industry probably dates back to the fifth or sixth millennium B.C., it has been one of the last of man's great industries to adopt scientific methods. Only within the present century have the weapons of modern science been employed to discover the actual nature of glass, and only now are the glass manufacturers realizing that they have been too secretive and too exclusive in jealously guarding their pet processes, that they must more and more rely upon scientific research. They have developed a remarkable *art*, handing down their formulae from generation to generation, but it now behooves them to make a *science* of their art.

This is particularly true now that great opportunities present themselves for using glass more extensively. For instance, if the glass manufacturers can reduce very slightly their costs of making glass containers, they can probably substitute glass for tin as the most important material for containers. Already glass has nearly displaced stoneware, and the industry is making serious inroads into the whiteware field, as colored glass is becoming popular for the table.

The fact that glass is a liquid has been fairly well established for many years (new research just announced may indicate a crystalline structure), but it was not until recently that the exact conditions of glass phase were determined. The Geophysical Laboratory of the Carnegie Institution of Washington, realizing the necessity of more scientific knowledge, has been conducting a fine program of research and has added much to our knowledge of the physico-chemical relationships in glass. Knowledge of these relationships should add greatly to an understanding of such properties as thermal expansion, heat conductivity, the refractive index, and of the variation of these with varying compositions. At the present time such knowledge is fragmentary and incomplete.

In England the Society of Glass Technology is sponsoring research, and likewise the Department of Glass Technology at the University of Sheffield. At the latter place has been written one of the two or three comprehensive textbooks extant upon glass technology. The Bureau of Standards in Washington has done notable work, particularly in optical glass, but very little work has been done in the universities. There is no body in the United States comparable to the English Society of Glass Technology, but there is a division of the American Ceramic Society devoted to glass technology. Under the direction of Professor Frederick H. Norton, '18, extensive work is being carried on in the Institute's Ceramic Laboratory on the manufacture of colored glasses and glazes. Another problem studied by Professor Norton is the development of a refractory

for glass melting tanks. One of the most serious problems in the glass industry is to find a refractory which will resist the molten glass and not throw off seeds or strings. A refractory block of pure kaolin has been designed, and it is giving excellent service in comparison with the usual fireclay blocks.

Obviously glass making holds great possibilities for the application of scientific methods, and undoubtedly great progress will be made in the immediate future. Science developed pyrex glass, and showed how it could be combined with other glasses (Dr. Frederick Keyes, Head of the Institute's Department of Chemistry, contributed to this solution). Science can do even more useful and spectacular things for the glass manufacturers, if they will only realize that their private trade secrets may not be the last word in glass making.

Opportunities for glass in the container field mentioned above will only be good if the glass technologist can prove himself as active and as good a scientist as the metallurgist. The latter is making available new metals for canning (stainless steel, alloys) and he is showing how certain old ones may supplement tin (aluminum).



Harold Willoughby

THE FOOD CHEMIST: DR. HENRY BORG IN THE LABORATORIES OF WALTER BAKER & COMPANY, INC.



LOADED AND AIMED: KLEMM AEROMARINE LOW-WINGED MONOPLANE

Galloway

A Discourse upon Anæsthesia, or Queen Victoria's Chloroform Child

CHLOROFORM and other anæsthetics employed to alleviate the pain of surgical operations and parturition are among the greatest boons that science has conferred upon mankind. It is fitting, therefore, that next year the one hundredth anniversary of the discovery of chloroform should be marked as a notable milestone in human progress.

Its discovery was made almost simultaneously by three men in three countries: Leibig in Germany, Soubiran in France, and Samuel Guthrie, Jr., in the United States. Leibig and Soubiran made almost simultaneous publications of their discoveries, but Guthrie several months earlier had stumbled onto chloroform while trying to make ethylene chloride in his backwoods laboratory in New York State. Not until 1847 was its use brought

Sir Humphrey Davy, Bart. (1778-1829) discovered in 1799 that pure nitrous oxide is perfectly respirable and he recorded how he became "absolutely intoxicated" through breathing 16 quarts of it for "near seven minutes."

Another pharmacological anniversary falls this year—the tercentenary of quinine. One of the most effective weapons for fighting malaria, its discovery in Peru was the entering wedge that brought about the end of Galenism and the beginning of modern medicine. The year 1931 also is the fiftieth anniversary of the discovery by Alphonse Laveran of the parasites causing malaria.

Vanishing Timber Supply?

NO thinking person who has even the slightest interest in posterity can remain indifferent to the suggestion that our timber supply is rapidly being

forcefully to the attention of the medical profession. In that year, Dr. James Y. Simpson, professor of obstetrics at the University of Glasglow, employed it to relieve the suffering of a woman giving birth to a child. Its use for this purpose met with great public disapprobation and a controversy ensued over the propriety of abolishing the pains of parturition. It was not until 1853 when Queen Victoria accepted it for the delivery of her seventh child, Prince Leopold, that chloroform and other anæsthetics were popularly accepted.

Ether is much older than chloroform although a convincing and influential demonstration of its value as an anæsthetic by Dr. Morton at the Massachusetts General Hospital came only a year earlier than Simpson's use of chloroform. The first to describe the preparation of ether by action of oil of vitriol on alcohol was Valerius Cordus (1515-1544).

Paracelsus, whose real name was Philippus Aureolus Theophrastus Paracelsus Bombast ab Hohenheim (1490-1541), described an "extract of vitriol" which possessed "an agreeable taste." "Even chickens will eat it whereupon they sleep for a moderately long time, and reawake without having been injured."

depleted to make paper, and it is true that 85% of our annual \$900,000,000 consumption of paper has its origin in the forests while in 1870 the entire production in the United States from woodpulp was valued at only \$172,-350. But it is equally true that only 4% of the drain on this country's forests is used today for pulp and wood chemical purposes, which proportion is but a tenth of the amount used for fuel, an eighth that used for lumber, and less than half the loss due to fires, tree diseases, and insects. Yet this 4% cares for nearly half our total yearly pulpwood, pulp, and paper requirement, the chief item of which is 4,000,000 tons of newsprint.

Obviously, however, the demands of wood for pulp as well as for other purposes may be expected to increase and, though much of the amount imported is produced by American capital, both the problem of an adequate foreign supply and the wisdom of continuing to import over half our total needs give cause for concern. That this matter of a foreign supply is one of moment was shown by the furor due to the temporary embargo in New York harbor last August of the *Christian Bors* and *Greslie*, the first of several shiploads of Soviet pulpwood from the Archangel district, being delivered in fulfillment of a contract between the International Paper Company and Amtorg.

Some of our imports come from Newfoundland and Scandinavia but Canada is our chief source today. Her exports of newsprint alone are second only to her exports of wheat and are greater than the newsprint exports of the rest of the world. In 1929, according to preliminary figures from the Dominion Bureau of Statistics, her newsprint production (85.2% of the manufactured products of her pulp and paper industry) was 95% greater than that of the United States.

Recognizing that our domestic source of wood for pulping and other purposes is a reproducible natural resource, professional forestry has made headway during the past 30 years. It is now conservatively estimated that the amount of new growth can probably be extended to exceed more than our present timber demands. Reforestation and intensive cultivation are, however, but part of the program.

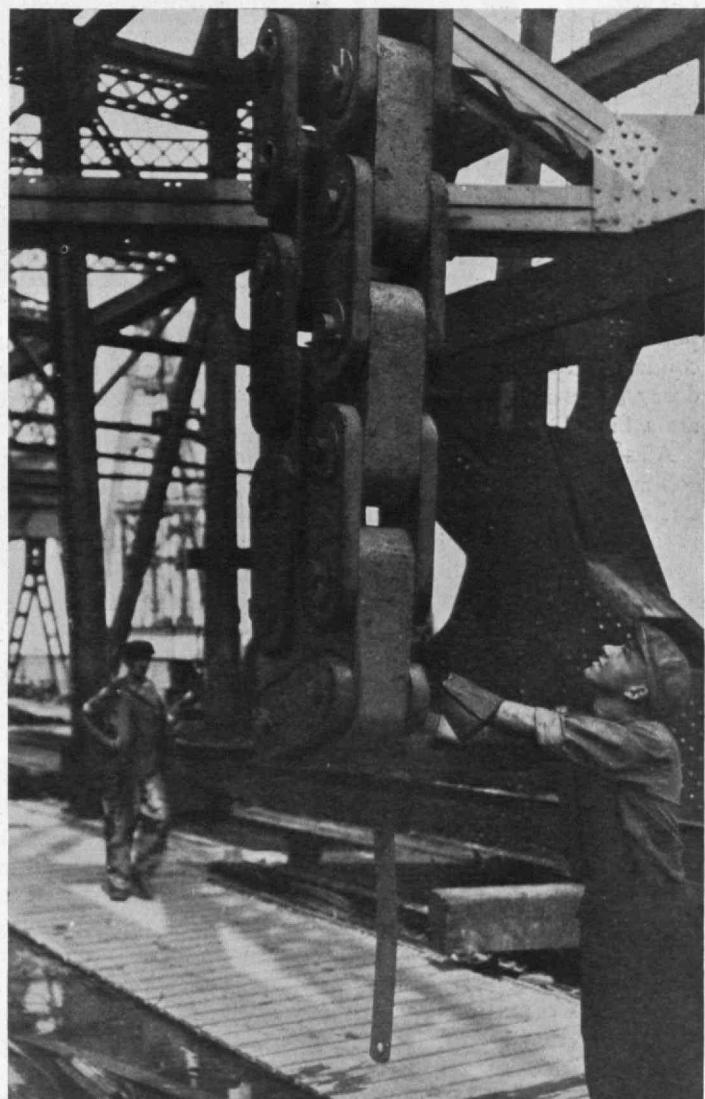
Europe has found means of coping with the forest fire menace and in Scandinavia the annual loss has been curbed to 500 acres. Last year in the United States 200,000 fires burned an area twice that logged. Nearly a third of these fires were due to carelessness, more than a third to incendiaries, only 6% to natural causes. Our annual growth approximates six billion cubic feet and the losses in standing timber due to fire, diseases, decay, and insects is placed at 2.4 billion cubic feet, while the loss due to decay of wood in service and storage accounts for 4.0 billion cubic feet. Forest pathology is now getting acquainted with causal fungi to prevent epidemics such as chestnut blight, white pine blister rust, and European larch canker. It is estimated that if approved practices at present known were generally applied, the drain on our forest material would be lessened to the tune of \$195,000,000.

Many European countries afford in their tax systems examples of forest conservation by taxing timber not while it stands but when it is cut. In the

United States annual taxes on timber holdings often force them into premature liquidation although a few states have recently voted to defer taxes on growing timber. Only one, however, extends the "sound tax yield principle" to mature timber.

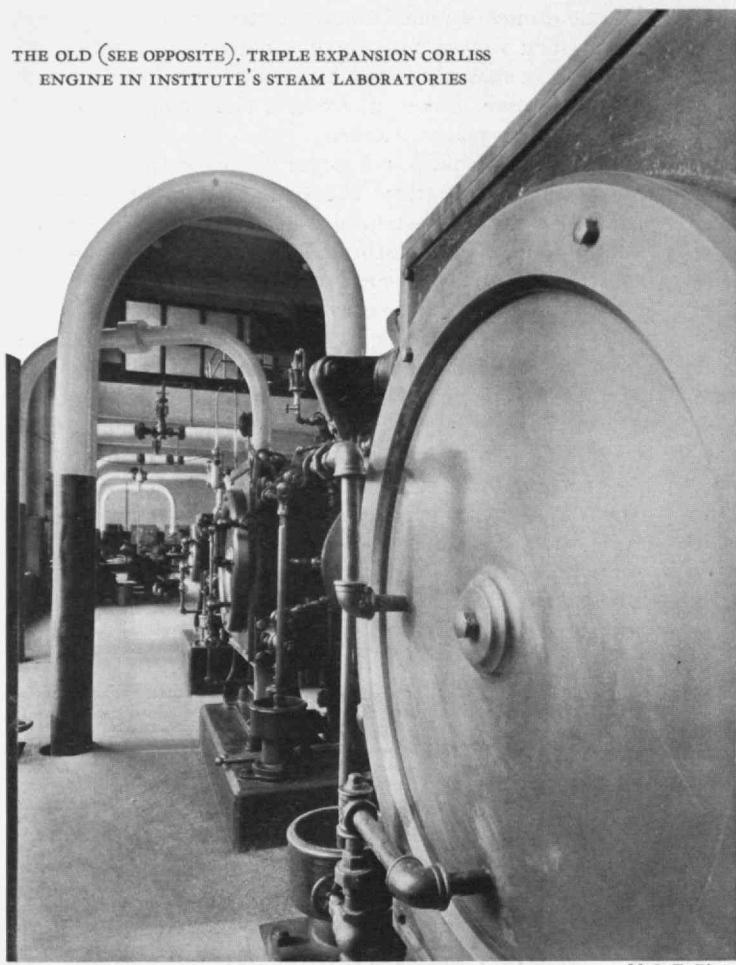
Hitherto the pulp and paper industry in the United States has been centered chiefly in the northeastern section, east of the Mississippi and north of the Mason and Dixon Line. There are found the important stands of spruce, fir, and hemlock east of the Rockies area and from these three species has come 76% of the pulpwood used. Now attention is turning to the West, South, and Alaska.

In the South are little spruce, fir, or hemlock of importance to the papermaker, but there is yellow pine and 20 years is sufficient to produce trees of this type in pulpwood size. Full-grown shortleaf pine on fully stocked land after 20 years will yield about 38½ cords per acre or nearly 2 cords per year; northern spruce requires 40 to 80 years to reproduce itself and yields only about ½ cord per acre per year. Thus four times the area is required, on a sustained yield basis, to supply a mill using spruce as compared with a mill using a like quantity of southern



Galloway
COUNTER-WEIGHT CHAIN USED TO HOIST THE LIFT SPAN OF HACKENSACK RIVER BRIDGE

THE OLD (SEE OPPOSITE). TRIPLE EXPANSION CORLISS ENGINE IN INSTITUTE'S STEAM LABORATORIES



M. I. T. Photo

pine. Moreover in the north, climatic conditions are not conducive to continuous harvesting of wood and the decay losses in storage piles of 50,000 to 100,000 cords are a factor. Gumwood is also available in the South.

Alaska offers enormous possibilities and, as pointed out in The Review last February, the U. S. Forest Service estimates that the total volume of timber in the panhandle is sufficient for producing 1,000,000 tons of newsprint a year without depleting the supply. Besides excellent water-power resources, tidewater transportation from forests to mills and from mills to markets, there is, paradoxically, an equable climate to permit plant operation and unhindered shipping throughout the year and a plentiful rainfall to minimize fire losses.

In the development of new sources of supply as well as forest conservation, the U. S. Forest Service has played a major part. Of the annual expenditures in forest research in the United States (about \$3,000,000) half is by the Federal Government, and about 8% by states, \$100,000 by endowed institutions and \$1,000,000 by the wood-using industries.

Industrial research into the treatment and uses of wood products is obviously the duty of the wood-using industries and in this the pulp people have made by far the most progress. Pulp products are now in extensive competition with sawn lumber and wood products in their natural form, wood fiber board boxes and insulating board are manufactured wholly or in large part of wood fiber.

Significant, therefore, is the new coöperative lumber industry-owned research laboratory in Washington established by the National Lumber Manufacturers Association of which Dr. Wilson Compton is Secretary. It indicates that the example of other American industries which spend over \$100,000,000 a year for industrial research with gains running into the billions, is now to be applied to the "vanishing timber supply."

Sunburn on Cloudy Days

WHY does it frequently happen that a worse sunburn is obtained on a cloudy day than on a clear day? Why is the burning effect of the sun greater at the seashore than in the mountains?

Work in the Departments of Physics and Biology at the Institute has suggested tentative answers. The infrared rays in sunlight tend to neutralize or inhibit the action upon the human body of their brother ultraviolet rays. Diffuse infrared rays seem to have difficulty passing through clouds or mist. Therefore, on days when the infrared is decoyed by clouds, the ultraviolet (which is likewise lessened by clouds), works its physiological changes without so much neutralization, and its effects are greater. Since there is less moisture in the mountains than at the seashore, there is more inhibition of the ultraviolet by the infrared and consequently the ultraviolet effect is abated in its severity.

This inhibiting effect of infrared rays was suggested in a report on the prevention of rickets by ultraviolet presented before the fall meeting of the American Public Health Association at Fort Worth, Texas, by Professor John W. M. Bunker and Robert S. Harris of the Institute's Department of Biology and Public Health.

Their report, based upon a two-year study of 800 rats, revealed that a much wider range of ultraviolet rays than hitherto thought acts in the prevention or treatment of rickets. The wave length range generally thought effective is between 3,022 and 3,026 Angstrom units, such a unit being about one two hundred and fifty millionth of an inch (.000,000,001 meter). When this range is extended to include ultraviolet rays of shorter wave lengths, greater ricket protection is obtained.

Frozen Foods

THE food technologist and the cryogenic engineer, joined in scientific marriage, are proving themselves strikingly fecund. The best known and most promising of their progeny is the process of quick freezing of foods at extremely low temperatures. By this method many perishable comestibles, the gastronomic delights of which have hitherto been confined to a season, can now be preserved in their natural state indefinitely. The coming commercial application of quick freezing, now in the pioneer stage, will be another triumph in man's conquest over time and deterioration.

Not since the discovery of means for making artificial ice, and the development of refrigeration, has any advance in food technology held such interesting possibili-

ties for economic and sociological change. Just as the application of refrigeration in transportation obliterated seasonal limits on a few foods, so quick freezing seems likely to bring further readjustments in human food habits, and perchance, actual physiological changes in the course of time.

Preservation of food by existing cold storage methods has certain limitations of time, and cannot be successfully applied to all foods. The slow freezing method in general use is likely to cause marked changes in texture in the products treated. In fruits, for instance, separation of water in the form of ice occurring in and between the cells, which is not absorbed during thawing, breaks down the structure and leaves the fruit soft and unpalatable, according to studies carried on by M. A. Joslyn of the University of California. He explains that during slow freezing, water is withdrawn from the cells to the intercellular spaces where the ice first forms. As freezing proceeds, the crystals grow and the spaces become filled with ice and the cells may be forced apart by ice pressure.

But in the new methods of quick freezing no such breaking down occurs, for at low temperatures the entire tissue freezes rapidly, the ice crystals forming within as well as between the cells. W. H. Chandler of Missouri Agricultural Experimental Station has studied injury to texture by slow freezing and has come to the conclusion that this effect is more than a merely mechanical disruption of tissues by ice crystals. There are indications, he finds, that the effects may be due to changes in the colloidal condition of the cells. These changes apparently do not occur in quick freezing.

Quick freezing extends the economic horizon of food preservation and conservation to limits undreamed of a few years ago. It holds meats, sea foods, fruits, and vegetables in a state of original color and flavor indefinitely, and in its economic aspects the process injects a new factor of balance.

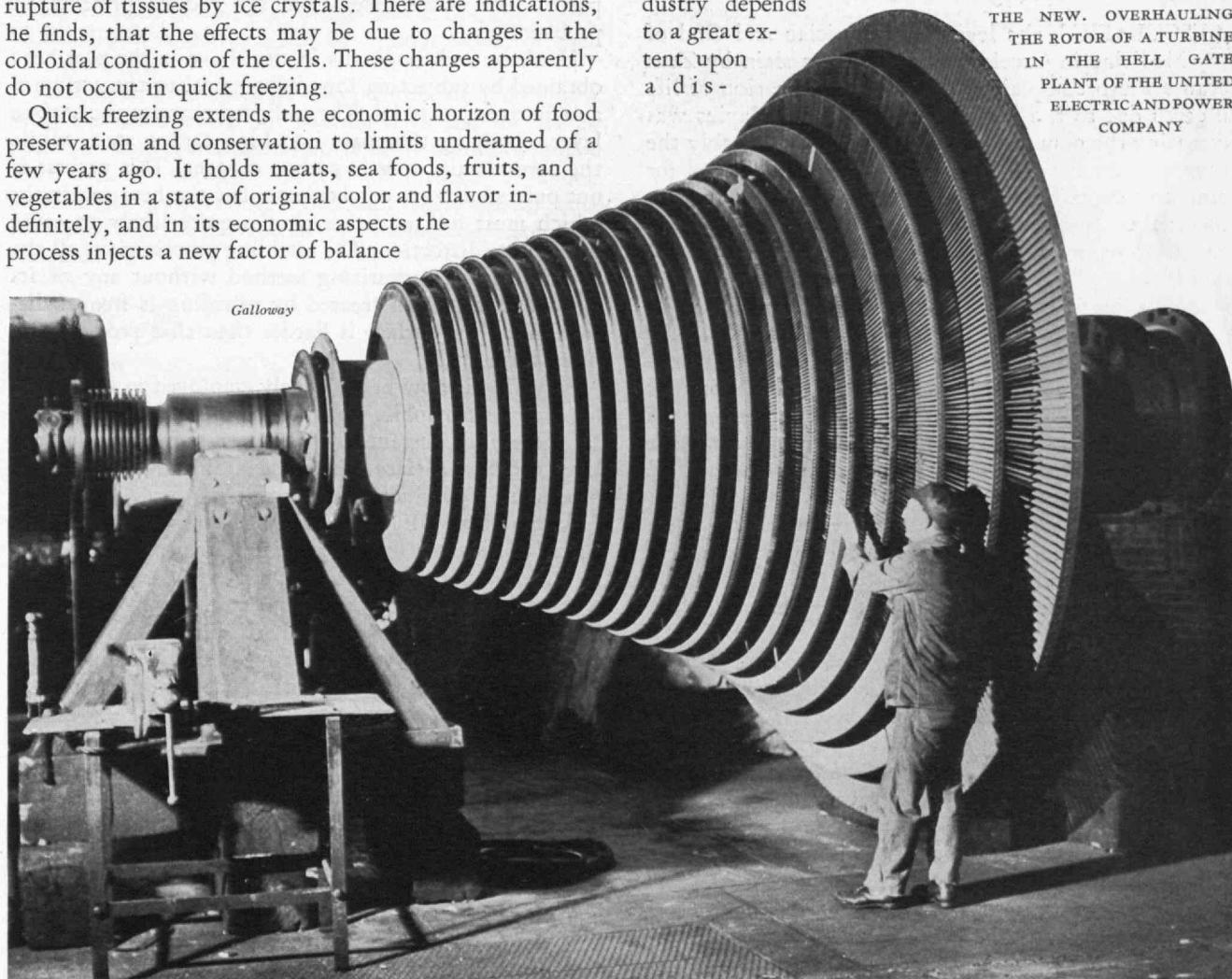
in the problem of supply and demand. Its benefits will accrue to the producer and the consumer in a year-round market unaffected by seasonal crops.

The field of development in quick freezing includes all kinds of meats, popular cuts of which already are being sold in attractive packages. Fruits that hitherto have been picked before they were ripe and marketed under seasonal disadvantages may now be allowed to reach full maturity in color and flavor and then be preserved for year-round enjoyment. Expressed fruit juices are also being preserved with slight loss in natural flavor. Quick freezing has already been applied to apples, strawberries, peaches, plums, cherries, and even ripe figs and raspberries, both of which are extremely perishable at ordinary temperatures. Sea foods are particularly adaptable for long term preservation at low temperature, and the United States Bureau of Fisheries sees high promise for the quick freezing of oysters, which research has shown can now be held in an edible state for at least 27 months. It also seems likely that quick freezing will be employed in the preservation of dairy products, and many other foods.

Now that quick freezing has been developed to a commercial stage, there remains the major problem of distribution. Public opinion, once suspicious of frozen foods, is turning in favor of quick frozen products. The success of this new food industry depends

to a great extent upon
a dis-

THE NEW OVERHAULING
THE ROTOR OF A TURBINE
IN THE HELL GATE
PLANT OF THE UNITED
ELECTRIC AND POWER
COMPANY



Galloway



M. I. T. Photo

TORCH-CUTTING

tributing system that will bring foods to the consumer in the original frozen state. This means new methods of refrigeration in transportation, and proper means for maintaining low temperatures in the retail establishment.

Refrigerant Therapy

AESCULAPIUS, the legendary physician and God of Medicine in Greek mythology, was slain by Zeus because Pluto complained that the prolongation of life on earth due to the administrations of Aesculapius was decreasing the population of Hades. This is probably the only instance in which a doctor has been punished for being too successful. Modern doctors, fortunately, are not faced with so discouraging a fate, a situation which the facetious may attribute to an overpopulation of Hades.

Aesculapius might have been slain much earlier had he the aids of present-day science at his disposal. Since the Renaissance the medical profession, wearing the seven-league boots of scientific method, has made enormous strides. Not the least interesting aspect of this progress is the quickness with which the doctors find uses in their own science for the discoveries made in the non-medical sciences.

Instances leap to the mind — x-rays, radium, ether. A recent one, the use of refrigerants for the treatment of skin diseases, is at hand. Both liquid air and carbon dioxide snow have been appropriated by dermatologists for the treatment of skin lesions.

The principle underlying the use of refrigerants is that of the production of an inflammatory reaction in the living tissues by sudden freezing. A wide range of reactions is possible, from a superficial dermatitis to the complete destruction of the frozen area. The advantage of this method lies in the fact that a relatively deep inflammatory process can be produced without necrosis, the freezing causing an interstitial sclerosis.

It should be carefully pointed out, however, that the only dermatologic lesions that are treated by carbon dioxide snow or liquid air are small growths and deposits of pigments. The claim has been made that eczema

and psoriasis yield to this treatment, but The Review is informed by the Bureau of Investigation of the American Medical Association that leading dermatologists hold an unfavorable opinion of this form of treatment. They admit, however, that the refrigerant treatment might conceivably have some value in cases where the diseases are limited in area and are of an extremely chronic form.

Rather than allow this item to create false hopes, we hasten to add that corns and bunions do not respond favorably to this treatment.

Harden the Surface and You Save All

SUCCESS in producing a steel of unusual core toughness, surface hardness, and great resistance to wear by the new process of nitriding, is the realization of a dream that has long been an inspiration in metallurgical research. And well it might be for nitrided steels are fast becoming indispensable to industry.

Nitriding is a comparatively simple process in which special steels are exposed to the action of ammonia gas at temperatures sufficiently high to cause the breaking down of the ammonia and absorption of the nascent nitrogen. The simplicity of the process is indicated by the method: within the furnace the steel to be treated is placed in a slowly moving stream of ammonia gas. The ammonia is the same that is commonly used in refrigeration, and disposition of waste gases from the process presents no problem.

Hardness and toughness in steel have in the past been obtained by subjecting low carbon steel to the action of a carburizing material. The carbon penetrates the surface layer, changing that part into high carbon steel, while the core remains low in carbon content. This process is not only somewhat cumbersome, but the heat treatment which must follow carburizing is quite likely to cause warping or distortion. The nitriding process gives all the benefits of the carburizing method without any of its disadvantages. Steel treated by nitriding is free of distortion and its surface is harder than that produced by older methods.

Nitriding is now being widely employed in the manufacture of automobile parts, including the gears, which are subject to constant wear, steering-gear parts, and the like. The hard surface of nitrided steel is also valuable in producing highly accurate gauges.

Although metallurgists have known something of the effects of nitrogen in iron and steel for nearly a century, it was not until 1916, that Dr. A. Fry, distinguished worker in metallurgy, after long research in the Krupp Works at Essen, first suggested nitriding as a commercial process. Further investigations in America and in France have developed the process to a high degree of commercial value.

The temperature to which steel is subjected in nitriding is comparatively low. This fact permits heat treatment of the metal before the hardening process without danger of changing the desirable physical characteristics. The temperatures in nitriding range from 900 to 1,000° F. but the temperature most commonly employed in commercial practice is 975° F. The time required for nitriding ranges from two to 90 hours, depending upon the depth of surface hardness desired.

New Metals for Old

METALLURGISTS are responsible for some of the most dramatic achievements of present-day science, although in the public mind they are largely unwept, unhonored, and unsung. The nitriding process (see page 140), the development of welding for ships and buildings, the new Aston process for making wrought iron cheaply, the new stainless steel and chromium alloys that adorn automobiles, furniture, and buildings—these are contributions from their laboratories.

It is they, also, who are making known how unfamiliar metals such as tantalum may be used advantageously. This metallic element, belonging to a family of three metals which includes vanadium and columbium, had its first successful application as a filament for the incandescent light. For this use it has yielded to tungsten, but many other uses are being found for it, particularly in the field of industrial chemistry. Here its corrosion-resistivity and strength render it serviceable for agitators, for laboratory ware (replacing for some uses the more expensive platinum), and for spinnerets in the rayon industry. It is also being used as a lining for autoclaves and acid towers.

Tantalum is exceptionally ductile when cold worked and may be hammered, rolled, machined, drawn, spun and punched into various forms. It is readily welded either to itself or to other metals and is not affected by hydrochloric or nitric acids, by organic acids, or even by aqua regia.

Its limitations include its susceptibility to hydrofluoric acid, the necessity of not heating it in air, and its inability to be worked when hot. It freely absorbs common gases such as hydrogen, oxygen, and nitrogen at moderately high temperatures, although these gases, once absorbed, may be driven out by heating the metal in a vacuum.

Radio Traffic Cop

TRAFFIC congestion is not alone a problem of the highways of the earth, for with the swift development of wireless communication space is filled with the flying impulses from a multitude of commercial and broadcasting stations. As Mr. H. B. Richmond, '14, describes at length in the first article of this issue, the Government has undertaken to chart the heavens and assign various wave channels to limit the operation of various types of stations for the benefit of all.

Development of crystal control of frequencies assigned to individual stations was a great step toward order in the ether, but with approximately 20,000 radio stations of various classes in operation it is now more than ever necessary to make sure that the various units are operating on their assigned frequencies.

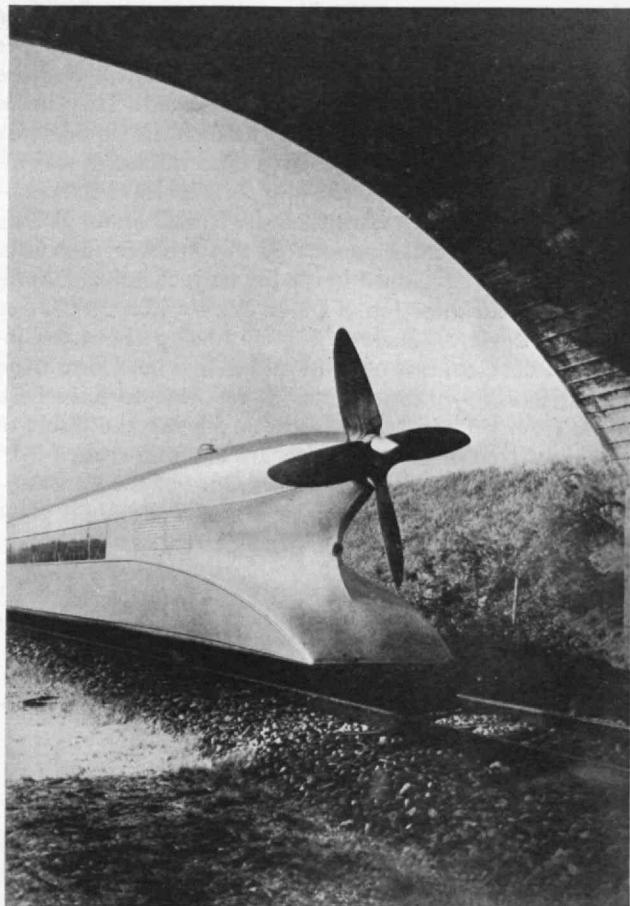
Now the United States Department of Commerce, of which the Radio Commission is a part, is building a great monitoring station at Grand Island, Neb., at approximately the geographical center of the country. Here a group of scientific radio traffic police will undertake to study the signals of the country's radio stations and take what action may be necessary to stop speeding, passing on curves, or misusing one-way thoroughfares.

At this great traffic control station, which will represent an expenditure of at least \$1,000,000, government engineers will check the power and the frequency of every station. This plan represents the Radio Commission's first comprehensive attempt to bring radio traffic under rigid control. The new station will coöperate with the Berne Bureau in Switzerland in checking the operation of foreign stations. Beyond its function as a regulatory force, the new station will in the very nature of its work carry on research from which may come a more complete understanding of the science of wireless communication and, perchance, a solution of some of the natural obstacles that at times make such communication difficult.

New Facts about Rubber

THE innumerable uses for which rubber has been adapted within the past twenty years have far exceeded the most fantastic dreams of the early workers in an industry that is now one of the most important in the world. Nor is the end in sight. New uses for rubber are being found almost daily and, while the world's supply still comes from the rubber tree, science is making a significant search for new sources of this most adaptable substance.

Perhaps the most striking recent development in the rubber industry is the application of latex, the sap of the rubber tree in its raw form, in an entirely new field of



Wide World

THIS AIR-RAIL CAR, IN LENGTH 85 FEET, DRIVEN BY A 400-HORSEPOWER AIRPLANE MOTOR WITH A PROPELLER HAS BEEN OPERATED AT 100 MILES PER HOUR NEAR HANOVER, GERMANY



Courtesy Boston Evening Transcript

ONE OF SIX NEW ONES: NANTUCKET LIGHTSHIP LOCATED 200 MILES EAST OF NEW YORK WHERE IT SERVES AS A BEACON FOR TRANSATLANTIC SHIPPING

usefulness (see November Review). In this respect, however, the modern rubber technologist is rediscovering an old secret, for in 1615, according to records of the explorations of one F. Juan de Torquemanda, the natives of Mexico and Brazil were making waterproof hats, garments, shoes, and even boats by impregnating various materials with the "milk-sap of a tree growing in the Amazonas." Latex is again being used for waterproofing textiles and for various other purposes. As for rubber footwear, the forerunner of the modern galosh was the crude rubber shoe of the natives of Brazil. They made clay casts of their feet, dipped the form in liquid latex over and over again until the required thickness was attained, and then crushed the clay form to leave a shoe.

As for new sources of rubber, the United States Bureau of Standards recently announced that rubber in crystal form has been developed in the bureau's chemical laboratory under the direction of Dr. E. W. Washburn, '05, (see October Review). Such rubber may bring about the industrial development of solid rubber in a new form. And in California synthetic rubber is reported to have been made from petroleum, the substance being the result of the extraction of certain hydrocarbons from crude oil.

Scratching around in the desert sands of the Caucasus, Russia has discovered that the sap of a perennial plant called kondrilla contains a high percentage of rubber,

and that rubber may also be extracted from the tausagyz plant. Factories are being built and the Russian government expects to produce 2,000 tons of rubber from kondrilla alone this year. Experiments are also being carried on in Russia to determine whether the Mexican guayule plant, which also contains rubber, can be grown in the land of the Soviets. Development of Russian sources of rubber, however, is said to be progressing. Little adequate research is being carried on there, however, and actual production is still prohibitively expensive.

Rubber already has done much to reduce noise, and its further usefulness for that purpose is indicated in experiments in England and Scotland, where rubber bricks have been used for paving streets. A rubber block pavement laid in one of Glasgow's busiest streets in 1923 is still giving satisfactory service and shows little wear. The blocks of rubber used were nine inches long, four and a half inches wide, and one and a half inches thick, and were laid on a concrete base. Rubber bricks laid in one of London's most traveled thoroughfares in 1926 have borne an extraordinary traffic load with a replacement rate of only 14% in three years. The only defects in the bricks replaced were slight blisters and peeling of a thin surface layer.

With all the progress made in the industrial development of rubber, much remains to be done in research which will throw new light on existing processes, many of which are empirical. The *Industrial Bulletin* of Arthur D. Little, Inc., directs attention to the need for more complete knowledge of the effects of the so-called "softners" which play a vital part in rubber manufacture. Among these organic substances are steric acid and pine tar, both of which are important in making the rubber for the tread of automobile tires. Softners are employed to control the manufacture of rubber at various stages, to permit higher loading with fillers, to increase the speed of manufacture in mixing, extruding or moulding, to promote or reduce adhesive properties, to give improved electrical waterproofing and airtight properties besides various other changes. The general effect of these softners is known, but their actions have not been classified to establish a relative order of merit for the specific effects desired.



F. I. Jordan

IN OCTOBER LIGHTHOUSE EXPERTS OF THE WORLD MET IN LISBON FOR AN INTERNATIONAL CONFERENCE ON UNIFICATION OF BUOYAGE AND LIGHTING OF COASTS

BOOKS

Scientific Book Club Selections

BY special arrangement with the Scientific Book Club, Inc., the Review is to present each month the books selected by that body as meriting the careful attention of all who desire to keep abreast of scientific thought. The selections are made by an editorial committee consisting of Arthur H. Compton, Edwin G. Conklin, Kirtley F. Mather, Harlan T. Stetson, and Edward L. Thorndike.

For November the principal selection was:

THE MYSTERIOUS UNIVERSE, by Sir James Jeans. \$2.25. 160 pages. Illustrated. New York: *The Scientific Book Club, Inc.*

Other highly recommended books are:

PHYSIQUE AND INTELLECT, by Donald G. Paterson. \$2.50. 290 pages. Illustrated.

THE ADVENTURE OF SCIENCE, by Benjamin Ginsburg. \$5.00. 465 pages. Illustrated.

EXPERIMENTAL CHEMISTRY, by A. Frederick Collins. \$2.00. 274 pages. Illustrated.

Conquering Disease

RIDERS OF THE PLAGUES, by James A. Tobey. \$3.50. vii + 348 pages. New York: *Charles Scribner's Sons.*

IN THE latest of his many books relating to public health, Dr. Tobey has provided a volume portraying the lives and accomplishments of leaders in the public health movement. The success of such books as "Microbe Hunters" and "Hunger Fighters" and several biographies of the Health Heroes (for boys and girls in their teens) has already demonstrated a public interest in this subject. Stories such as these have a triple appeal, for we are interested in health, in human progress, and in biography. "Riders of the Plagues" uses biography as the enjoyable vehicle for presenting many interesting facts concerning both public health and social progress.

We have here a portrayal of man's rise from ignorance, fear, and superstition as indicated by his attitude toward disease. Gradually the accumulation of scientific knowledge has supplanted priestcraft doctors and barber surgeons with the splendid science of curative medicine. Similarly, the science of public health, or disease prevention, quite distinct from the treatment of diseases, has built its own technology with the development of Public Health Laboratory Technique, Epidemiology, Vital Statistics, Sanitary Engineering, and associated fields of knowledge. Clearly public health is not a mere phase of medical science, for we find among the foremost leaders in the battle to prevent disease, such people as Chadwick, the lawyer; Shattuck, the statistician; Florence Nightingale, the nurse; and Sedgwick, the epidemiologist and teacher. Pasteur, the greatest hero in the whole long list, was a chemist.

The book begins with a story of the great plagues in the past. Disease is frequently seen as a determining factor in war, and in the migration of races as well as in

the development of religious and national customs. The pestilences of antiquity, Saint Anthony's Fire, the Black Death, the Dancing Sickness, and Jail Fever, are described. The first Board of Health appears in Venice in 1348, establishing and naming the first "quarantine," a period of forty days "for no scientific reason but that that was the duration of Christ's stay in the desert." Sanitation began in the days of Imhotep and Ptolemy, of Hypocrates and Galen, of Moses and Asoka. Sanitary Engineering of real merit contributed to the grandeur of Rome, but the sanitary standards of the Middle Ages were seriously lowered.

The Eighteenth Century shows some significant beginnings. In 1720, Dr. Meade writes on pestilential contagion. Twenty-five years later John Wesley, the clergyman, writes on "Primitive Physick." In 1767 Dr. Baker demonstrates lead poisoning in Devonshire cider. In 1771 Captain Cook shows how to prevent scurvy. In 1796 Dr. Jenner develops small pox vaccination. But by the middle of the Nineteenth Century things really begin to happen. Mr. Chadwick's studies result in the creation of the first General Board of Health in England. Dr. Snow proves the spread of disease by polluted water and Mr. Shattuck in Massachusetts prepares the report which is thought by some to be the most remarkable document in the history of public health.

At this point the author devotes a chapter to each of six outstanding figures in public health. First appears Pasteur who made public health a science through his discovery of microbes, germ diseases of silk worms, anthrax vaccination, and the treatment of rabies. Florence Nightingale, the Lady of the Lamp, saves thousands of lives in the Crimean War, and lays the foundation for the development of the nursing profession which today number in the United States alone, 20,000 Public Health Nurses, 200,000 Registered Nurses, and 150,000 so-called Practical Nurses. Around Joseph Lister is built the story of the emergence of modern sanitary surgery from the primitive surgery of the remote past and the terrible conditions of wide-spread infection in connection with the surgery just preceding our knowledge of germs. The story of Walter Reed, and his associates, reveals man's conquest of the mosquito-borne diseases. The Story of Trudeau shows our struggle against that ancient foe of man, tuberculosis.

A chapter of special interest to many of the readers of this magazine deals with the work of Professor William Thompson Sedgwick, who is spoken of as the foremost exponent of sanitary science during the last twenty-five years of his life. Under Sedgwick's leadership "it was not a medical school, but an engineering institution which took the initiative in offering the first real instruction in public health, in this country . . . and more trained sanitarians have so far been bestowed upon the United States by this same school of engineering than by all the other medical schools of public health combined." His work in the typhoid epidemic of Lowell and Lawrence in

1890 has caused him to be called the father of epidemiology. His work at the Lawrence Experiment Station with Professor Drown, Mr. Mills and a group of young students at the Institute, including George W. Fuller, W. O. Gordan, Gary N. Calkins, X. H. Goodnough, the late Allen Hazen, and others, laid the foundation for American sewage disposal practice. A station for the study of water purification was established at Chestnut Hill, in charge of George C. Whipple who later became a Sanitary Engineer of national reputation. It was the suggestion of Mr. Whipple, then a Professor at Harvard University, which resulted in the creation of the School for Health Officers, which was conducted jointly by the Massachusetts Institute of Technology and the Harvard Medical School from 1913 to 1922. Professor Sedgwick was instrumental in bringing about this coöperation and served as Chairman of the Administrative Board of this School, which operated without special endowment for teaching or for scholarship grants, and which trained nearly two hundred men and women. He was the first President of the American Bacteriological Society and an advisor in public health administration to the State of Massachusetts, the Rockefeller Foundation, and the National Government. His place and services as a teacher illustrate the fact that it is men and not buildings which make a university or school. Splendid tribute is paid to Chapin, Vaughan, Biggs, Winslow and other contemporaries.

The remaining chapters, dealing with nutrition and the problem of further improving the quality of health and at the same time further extending the span of life, show us that the great fields of scientific discovery in the realm of health with their potential services to mankind are still before us.

The story moves rapidly and the style of the straight narrative is excellent. The tone of the book is wholesome and optimistic; yet in a few places one feels that the humor is forced. No two authors would give the same relative values to men and incidents, but Dr. Tobey's perspective is broad and sound. It is safe to say that all who read the book will feel well repaid for the investment of reading time.

CLAIR E. TURNER

A History of Humanity

A HISTORY OF SCIENCE AND ITS RELATIONS WITH PHILOSOPHY AND RELIGION, by William C. D. Dampier-Whetham. \$4.00. xxi + 514 pages. New York: *The Macmillan Company*.

IF SCIENCE is positive knowledge, a history of science is a history of the intellectual activity of man. If knowledge is considered in its relations with philosophy and religion, then a history of that knowledge is a history of human culture. One recent thinker has said that it is the business of science to supply beliefs for the mind to accept, and the business of religion (and philosophy) to give us something for the heart to cling to. In the light of this distinction it is interesting to inquire into the status of the conflict between science and religion. But the point we wish here to emphasize is that science and religion (and philosophy) defined in this way constitute between them the very essence of humanity. Another recent thinker has said that science seeks to discover what

is, while religion and philosophy seek to discover whatever is to be done about it. As our knowledge of the universe improves, our reaction to it alters. So again, our knowledge plus our reaction to our knowledge, these two taken together constitute us—and a history of them is a history of humanity in its broadest sense. A knowledge of such history—of man, the measure, the measurer, and the measured—is the only genuine basis of humanism.

A history of science and its relations with philosophy and religion, being a history of the life of mankind, presupposes some acquaintance with the conditions which have determined the mode of that life, that is, with political history and a small amount of such material inevitably appears in the present book. There is enough for its significance to be clear. The book is cordially recommended to those who think that political history is history. And it is recommended to persons of congenital culture, who will find in it much to weigh and to consider. A few interesting passages follow:

"Platonism in its various forms was left to represent Greek thought to later ages, a fact which was one of the reasons why the scientific spirit vanished from the earth for a thousand years. Plato was a great philosopher, but in the history of experimental science he must be counted a disaster."

"In religion, and in social and political structure, we are still akin to the Middle Ages from which we have so recently emerged; but in science we are nearer to the ancient world. As we look back across the mist-filled hollow, we see the hills behind more clearly than the nearer intervening ground, illuminated only by the 'dim light of scholasticism and theology.'"

"Even physicists had lost touch so entirely with philosophy that when in 1883 attention was called by Ernst Mach to the philosophical basis of mechanics, his work was ignored by some, slighted as fanciful by others, and overestimated for originality by the few who studied and appreciated it."

Dampier-Whetham's book is probably the best one-volume history of science which has appeared within recent years, but for all that, it is not an adequate treatment of the subject. It does indeed show the working out through the ages of many tendencies of mind. To one who is not familiar with the history of science, it will open new vistas and will serve as an introduction to the history of humanity. To one who is already familiar with the subject, it will also be of value and interest. The account of the history of philosophy is especially good, and shows that science and philosophy are inextricably connected. Knowledge advances by their interplay.

The treatment of the history of chemistry is far from satisfactory. The fictitious Basil Valentine is spoken of as if he really existed. No mention is made of the fact that "the Swiss alchemist and quack doctor," Paracelsus, introduced opium and mercury into European medicine. Boyle "is chiefly remembered for his discovery that the volume of a given quantity of air is inversely proportional to the pressure, and for the Irish epitaph in which, it is said, he was described as the Father of Chemistry and Uncle of the Earl of Cork. He was also a philosopher of a very moderate, pleasing and English variety." The names of Willstätter and Haber do not appear in the index. Berthelot is mentioned only in (*Concluded on page 166*)



THE INSTITUTE GAZETTE



Physics and Chemistry Building

LAST July The Review recorded President Compton's hope for a new physics and chemistry building at an early date. Happily that date is at hand, and construction is to begin immediately. Funds for starting the building, which will join two wings of the present buildings on the east side of the main Technology educational group, are available from the gift of \$2,500,000 donated by Mr. George Eastman in 1916, as a supplementary fund for additional educational buildings, when needed.

The new structure will be over 300 feet long, 60 feet wide and will contain four stories, plus basement. It will include a well-equipped shop for the construction and maintenance of the delicate instruments used in research; a spacious lecture room; and a joint library and reading room for the use of the staff and students in physics and chemistry. The research rooms have been designed to permit the greatest flexibility in arrangements for future requirements. The construction specifications call for a structure of unusual rigidity with foundations of heavy reinforced concrete to aid in eliminating vibration, a necessary requirement because of the exacting standards of research in this field.

The importance of spectroscopy in the study of atomic and molecular structure which in the next decade seems certain to become the most important agency in chemical research, is recognized in plans for an additional separate spectroscopic laboratory to be housed in a building which will occupy a site in the quadrangle formed by the new physics building. The construction of the spectroscopic laboratory presents features which have called for engineering rather than architectural design. The two floors of this laboratory will be supported on a foundation of unique design which will be entirely separate from that of the outer walls and the roof of the building. This foundation is to be more than three feet thick, and composed of alternate layers of sand, felt, transite board, ground cork, and reinforced concrete. These elaborate precautions are expected to entirely eliminate shocks and vibration from industrial processes in the neighborhood and the movement of traffic on adjacent highways.

The spectroscopic laboratory will be 100 feet long and 60 feet wide, and in addition to the extraordinary precautions to eliminate vibration, provisions will be made for maintaining extreme constancy of temperature. The

equipment of the laboratory includes a collection of the finest instruments which have been gathered at Leland-Stanford University by Professor George R. Harrison, who this year joined the staff of Technology as Director of the Research Laboratory of Experimental Physics.

In addition to the proposed physics and chemistry building, plans for a cryogenic laboratory for fundamental studies in the science of low temperatures are under consideration. These plans provide for a laboratory with the most advanced facilities for this type of research, with plants for the production of liquid nitrogen, hydrogen and helium. Such a laboratory will place Technology in a unique position in America for carrying on important physical and chemical investigations.

The main physics building is being designed by the architectural firm of Coolidge and Carlson (Harry J. Carlson, '92), and the spectroscopic laboratory by the engineering firm of Charles T. Main (Charles T. Main, '76, Charles R. Main, '09), Inc.

Acting Assistant Dean

APOINTMENT of Thomas P. Pitré as Acting Assistant Dean was announced by President Compton on November 7. This appointment, which became effective on that day, was made in recognition of the growing importance of the services of the Dean's Office, and to meet the requirements of Technology's increase in Freshman enrollment.

In addition to his duties as Chemistry Instructor, Mr. Pitré has been in charge of freshman registration for the past two years. In this work he has been closely in touch with Dean Harold E. Lobdell, '17, and therefore has had much valuable experience with first year students.

Mr. Pitré was graduated from Amherst in 1919, and from that time until 1920 he was a teacher at Phillips Andover. In 1920, he was appointed to the teaching staff of Technology as an Instructor in Chemistry, which position he will continue to fill as well as that of Acting Assistant Dean.

Presidential Report

NOTABLE in content was the annual presidential report covering the academic year 1929-1930 which Dr. Stratton presented to the Corporation this fall. The report surveys the activities of Technology during the closing year of Dr. Stratton's presidency. It likewise



THOMAS P. PITRÉ, WHO BECAME ACTING
ASSISTANT DEAN ON NOVEMBER 7

contains plans for the future which Dr. Stratton, as Chairman of the Corporation, and Dr. Compton, as President, expect to complete during oncoming years.

Dr. Stratton commended the Department of Hygiene and pointed out the justification for the required physical examinations for all students which until two years ago was required for freshmen only (See The Technology Review, December, 1928).

Two important new subjects will be offered at Technology this year designed to train men in geodesy and seismology. The former subject, one already undertaken in the Department of Civil Engineering, will be expanded to include vital study of the earth's movements. The work in seismology, the science of earthquakes, is instituted to develop new knowledge on the effects of earthquakes on engineering structures.

In calling attention to the demand for graduates of the Department of Mechanical Engineering, he reported that all seniors and graduate students of last year had secured positions before their graduation and that 50% more could have been placed had they been available. The work of the Testing Materials Laboratory has expanded and new equipment has been installed. The Textile Laboratory has also developed rapidly, and it is busy with important research. Dr. Stratton noted the growing importance of metallurgy and how the work of metallurgical engineers in recent years has revolutionized a number of industries. The demand for experts in this field exceeds the number it has been possible to train, and the Institute's registration of students pursuing metallurgical work has increased. The Department of Mining and Metallurgy is not only training men for this profession, but it is also carrying on research of major importance.

Other items of interest to Alumni include: 1. The success of Course XVII, Building Construction. Besides its emphasis in fundamental science and engineering, this course gives training in construction methods, assembly of materials, the relation between the architect and the engineer, and the most efficient utilization of labor; 2. The growing value of the new Hydraulic Engineering Laboratory, established during the past year. The studies that are carried on in this Laboratory include harbor control, dam construction, power development, turbines, rotary pumps, propellers, and so forth; 3. The wide interest aroused by the Department of Fuel and Gas Engineering organized several years ago; 4. The creation, as announced in The Review last July, of the Course in Business and Engineering Administration, separate from the Department of Economics and Statistics; 5. The success attending the work of the new Course in Meteorology established two years ago.

The 147th Alumni Council Meeting

EIGHTY-THREE members and guests were present in the North Hall of Walker Memorial on the evening of October 27 for one of the largest meetings of the Alumni Council ever held including the now celebrated 100th Meeting whereat Walter Humphreys, '97, received a watch, and the Alumni, indigestion.

The major item on the program of the 147th Meeting was the introduction of Dr. Compton and the address by him on Alumni Relations. Dr. Compton outlined the most

pressing needs of the Institute—notably, higher salaries for its Staff, more space for laboratory and instructional work, a dormitory for graduate students, and an enlargement of Walker Memorial, the student social center (see plans in the May, 1930, Review). He compared the educational process of the Institute to an industrial process wherein it is first necessary to acquire raw material, then to manufacture it into a finished product, and finally to sell it in a ready market. He pointed out how essential it was that there be no obstruction to this flow of material, and he enumerated the ways in which Alumni could help in obtaining the best raw material, how they might suggest better means of educating it at the Institute, and finally how much they could aid in placing it. He stressed the Institute's need for more publicity and said that two moves were necessary to obtain this end: (1) larger publicity service at the Institute and (2) more activity on the part of Alumni. The most valuable publicity, of course, is the success of the Alumni themselves.

He further discussed the possibilities of colleges extending their educational process to include the Alumni. Amherst, for instance, a number of years ago put such a plan into operation, and many other colleges have attempted some form of adult or Alumni education. Princeton for a short period mailed out a series of lectures to its Alumni. Dr. Compton was dubious about the success of any of the plans yet developed, but he expressed the opinion that The Technology Review here at the Institute was serving admirably as a means of keeping the Alumni informed in their special fields.

Donald G. Robbins, '07, presided in the place of Thomas C. Desmond, '09, whose campaign for State Senator in the State of New York precluded his being present—an absence upon which the Council stamps approval since later advices have indicated that Mr. Desmond won. Vice-President Robbins introduced the new members of the Council who were present at the dinner. These included: John C. Damon, '05, Representative of the Technology Club of Kentucky, at Louisville; Arthur Winslow, '81, Class Representative; Gorham Dana, '91, Class Representative; Eben B. Haskell, '26, Class Representative; Harold P. Champlain, '31, President of the Senior Class. The following new members of the Council whose names were called were not present: Willard W. Dow, '01, Representative of the Technology Association of Minnesota at Minneapolis; James I. Banash, '06, W. Rawson Collier, '00, Robert J. Marlow, '17, Burt R. Rickards, '99, and Carl J. Trauerman, '07—all Representatives-at-Large. During the salad course, Vice-President Robbins also introduced Richard H. Ranger, '11, who was present as a representative of The Technology Club of New York. Mr. Ranger spoke briefly about the activity of his Club and about the possibility of instituting a series of lectures there by Technology professors.

The first item in the business meeting was the presentation of the report of the Secretary. Professor Charles E. Locke, '96, Secretary, was absent because of sickness, and for him J. Rhyne Killian, Jr., '26, presented the report of the Executive Committee meeting which had convened at 5:00 P.M. preceding the Council meeting.

In accordance with a recommendation of the Executive Committee, it was moved, seconded, and passed by the Council that the Vice-President appoint a committee



Photograph by Peter A. Juley & Sons from a painting by H. C. Christy

T. COLEMAN DUPONT, '84, INSTITUTE BENEFACTOR, LIFE MEMBER OF ITS CORPORATION, AND FORMER PRESIDENT OF THE ALUMNI ASSOCIATION, WHO DIED ON NOVEMBER 11

from the Alumni Council to make recommendations on suitable inscriptions for the new dormitories to classes and individuals who contributed to the dormitory fund. In accordance with this vote Vice-President Robbins named the following committee: Samuel C. Prescott, '94, Chairman; Thomas B. Booth, '95; and Gorton James, '10.

The next item on the agenda was a progress report of the committee on a new method of electing Term Members on the Corporation, and this was presented by Dr. Allan W. Rowe, '01. He reported that his committee likewise was moving toward a complete revision of the Association's Constitution — a revision, of course, made necessary by the new term membership plan.

In accordance with a custom long adhered to, the Secretary had invited to the Council meeting the members of the Corporation whose terms expired at the end of the last fiscal year, and the new members of the Corporation

elected by the Alumni to replace them. Of the three retiring members, Salmon W. Wilder, '91, was present, and Vice-President Robbins called upon him for a word of greeting to the new Corporation members. Mr. Wilder spoke briefly of the pleasure he derived from being a member of the Corporation and of the great opportunities it presented for association with able men interested in the Institute.

Of the new members of the Corporation, Godfrey L. Cabot, '81, was present, and he expressed his wish to be able to pull his "load in the boat" as a member of the Corporation.

Dr. Allan W. Rowe, '01, next presented two more reports. The first, a report of the Committee to Nominate Members of the Advisory Councils for Undergraduate Activities. This Committee had names to present at this time because of the action taken last May in increasing the size of these committees. The names he presented for membership on these committees are as follows: Walter J. Hamburger, '21, Advisory Council on Tech Show, until 1932; Harold S. Wilkins, '14, Advisory Council on Boat House, replacing William B. Thomas, '29, resigned, until 1932; and J. Rhyne Killian, Jr., '26, Advisory Council on Undergraduate Publications, until 1933.

The second report presented by Dr. Rowe was the report of the Committee on Audit and Budget. He stated that the Auditors, Patterson, Teele and Dennis had made their annual investigation of the Association's books and found them in good condition.

He further stated that as Chairman of the Committee on Audit and

Budget he had looked over the report of the Treasurer covering the operations of the Association for the past six years, and had noted in that report the contributions made by The Technology Review to the financial well-being of the Association. During a period of six years, The Review had turned over in profits to the Alumni Association more than \$29,000. He pointed out that the Executive Committee two years ago had moved to set aside a portion of The Review profits in an endowment fund known as The Technology Review Fund, and placed in the custody of the Committee on Permanent Funds. He then recommended that this policy of placing a portion of The Review profits in The Technology Review Fund be continued.

Vice-President Robbins placed this later recommendation of Dr. Rowe's before the Council, and it was voted that it was the sentiment of the Council that a portion of

The Review profits be placed in The Technology Review Fund under the custody of the Committee on Permanent Funds.

Vice-President Robbins next introduced to the Alumni Council the following new Faculty members: John C. Slater, the new Head of the Department of Physics, George R. Harrison, Professor of Physics, R. M. Langer, Assistant Professor of Physics. Dr. Samuel W. Stratton, Chairman of the Corporation, was presented to the Council. He spoke briefly about his appreciation of the coöperation that the Alumni gave him at all times.

The Honors Group Plan Report

ONE of the pioneer efforts in American engineering education to provide exceptionally able students with greater opportunity for exercise of originality and vision was authorized by the Faculty for trial in the Department of Electrical Engineering beginning with the fall of 1925. The first formal report of the Department's experience, made recently to the President and Faculty, is of considerable interest.

According to the report, the plan developed by the Department (a description of this plan appeared in the January 1929 issue of The Review under the title, *Honors Study in Engineering*) aims to provide an independent atmosphere of work designed to stimulate an attitude of intellectual courage and resourcefulness in students of appropriate mental capacity and personal qualifications. The honors students have done notable work under the arrangement, and have in a large measure developed those qualities which the plan aims to instill. The interesting feature of the academic records of these students is that in general a marked upward trend is shown during the two year period of honors study as compared with the records of other electrical engineering students during the same period or as compared with the records of the honors students prior to their period of honors study. However, the reason that the records are gratifying is not on account of their excellence alone, but primarily because they were earned so largely by independent work.

The total number who have been graduated as honors students now numbers 87. Since the first of these have been graduated but a few years, and since a large number have continued in graduate work, it is rather early to make a study of their accomplishments in their subsequent occupations. A study of this sort is contemplated when the time seems appropriate. However, a number of cases of notable accomplishment already have come to the attention of the Department. Each year, fellowships established by Gerard Swope, '95, for the purpose of encouraging graduate study have been awarded the two senior honors students of highest standing (a third Swope Fellowship is awarded in Physics).

The plan now is in its sixth year of operation with 21 honors students in the junior and senior years. They are: Charles B. Basinger, Kenneth R. Bolles, Gordon S. Brown, Alfred L. Dowden, Kenneth J. Germeshausen, David M. Goodman, Davis D. Lewis, Samuel B. Pritchard, Howard L. Richardson, Michael G. Rogers, and Donald B. Sinclair, all of the Class of 1931, and Henry S. Duncan, John C. Gibson, Milton S. Hathaway, Frank M. Ikuno, William R. Power, Jr., John Cecil Rowe, Elwood

W. Schafer, Thomas R. Smith, Harold A. Traver, Herbert M. Wagner, and Fred D. Williams, Jr., all of the Class of 1932.

Following the presentation of the Department's report, stating the progress of the work, the Faculty voted to authorize the Department to incorporate the Honors Group Plan as a permanent part of its educational process and to permit other departments to adopt similar plans should they so desire. The Electrical Engineering Department therefore is continuing to develop its plan along the lines already laid down and endeavoring to render the functioning of the plan more and more effective. The object of immediate study is the status of the comprehensive examination given to honors students near the end of the senior year. Last spring, with permission of the Faculty, the comprehensive examination was for the first time made a requirement and administered by outside examiners invited from industry: Ernest E. Johnson, of the General Electric Company, Timothy E. Shea, '19, of the Bell Telephone Laboratories, Incorporated, Hugh H. Spencer, '23, of the New England Power Construction Company, and Herbert R. Stewart, '24, of the Westinghouse Electric and Manufacturing Company. The results of this examination were very interesting and very useful as a gage of the effectiveness of the plan and as a basis for the improvement of future examination procedure.

The workings of the plan are being studied by other departments of the Institute and by other engineering schools. Future reports of the Department of Electrical Engineering upon this subject will be anticipated with interest.

Deaths

WITHIN a fortnight last month death removed two men who have played major roles in the history of the Institute: Frederick P. Fish, a Life Member of the Corporation since 1902, and from that date to 1926 a member of its Executive Committee; and T. Coleman duPont, '84, a Corporation member since 1906 (Life Member 1911-30), and President of the Alumni Association during the year 1919-1930.

Mr. Fish, who died November 6, was a distinguished lawyer and business man, having been President of the American Telephone and Telegraph Company for many years. He was particularly interested in the Department of Electrical Engineering, being a member of the Visiting Committee of that department from 1902 to 1911. After he retired from the Executive Committee, he became a member of the Visiting Committee of the Department of Physics and of the Membership Committee of the Corporation.

Mr. duPont, who died on November 11, besides giving greatly of his time to the Institute, gave more than a million dollars, it being his gift that made possible the purchase of the land upon which the Institute now stands. One of America's great business leaders, he made a fortune in mining, and later when 39 years old accepted the Presidency of the E. I. duPont de Nemours and Company, placing that company in its present commanding position. He was Senator from Delaware from 1921 to 1922 and from 1925 to 1928. In a forthcoming issue The Review is to publish an extensive account of his career.

MAKING MAPS FROM THE AIR

(Continued from page 130)

of 12-inch focal length at 10,000 feet altitude produces a usable area from each photograph of about 0.65 square miles, at a scale of about 830 feet to the inch. So multiple-lens cameras have been perfected and one four-lens instrument under the above conditions gives a usable area for mapping purposes of 4.0 square miles for each simultaneous exposure of the four negatives at a scale of about 1,500 feet to the inch. The single lens camera cuts a swath of 1.4 miles in width per flight strip; the four-lens camera, one of 6.2 miles. Thus an economy in flying time is effected. One exposure is taken vertically, the other three are oblique shots and they must be "transformed" or rectified before being used in map compilation. This, however, is easily accomplished in a special printing device. Photographs from a multi-lens camera are seldom used for making mosaic maps although they can be. Generally they are used after rectification to compile line maps by the radial line method.

The equipment of the expedition of the U. S. Navy in 1929 to map 13,000 square miles of Southeastern Alaska gives an idea of a large-scale application of the procedure above outlined. Four amphibians with Pratt and Whitney Wasp engines were used: two for mapping, one for oblique photography, and a fourth as reserve in case of emergency. On the expedition it is estimated that all the planes flew 677.40 hours and totalled 54,182 miles. On mapping flights, they flew over 19,436 miles in 242.95 hours and this they accomplished though rain fell 75 days out of the 104 spent in Alaska. Under such conditions it was found that a multiple-lens camera was valuable.

In each mapping plane there was a personnel of three: the pilot, the navigator, and the photographer. The work was carried on from an altitude of 10,900 feet in atmospheric conditions that varied from -6° to $+40^{\circ}$ F., the photographer being taxed with the necessity of making exposures often enough to allow for a 70% directional overlap. This was made particularly difficult because of the irregular topography of the Alaskan Panhandle where the elevation of the terrain varies from zero at sea level to 8,000 feet. Such variations made it necessary to watch carefully the interval between exposures, the shortest used being seven seconds and the longest, 32 seconds. But with the aid of the view finders used with the cameras, the 70% directional overlap was made possible in spite of the apparent difficulties.

Before each mapping flight was attempted, a careful analysis was made of the charted area, using the best available charts — preferably those of the U. S. Coast and Geodetic Survey to the scale of 1-200,000 or of the International Boundary Commission to the scale of 1-250,000. Flight lines were drawn $4\frac{1}{2}$ miles apart and where possible at right angles to the shore line. The spacing of $4\frac{1}{2}$ miles was to allow for lateral overlap of 30%.

Since the Alaskan Expedition, the Army Air Corps and Fairchild have developed a five-lens camera, taking one vertical and four oblique photographs.

In Canada, where aerial surveying methods have been extensively developed, the practice is to compile line maps from either vertical or oblique photographs without assembling the actual photographs into a "mosaic" at all.

When vertical photographs are used the Canadians employ what is known as the radial line method. Briefly, it consists of locating all features desired for the map by means of intersecting lines. Every point is common to at least two and often more photographs. This being true, it is possible by intersecting lines to establish various traverses corresponding to the various strips of photographs and accurately locate every physical feature shown in the photograph.

In the oblique method, as used in Canada, the optical axis of the camera is depressed at an angle approximately 17 degrees from the horizontal. The plane usually flies at an altitude of 5,000 feet; one photograph is taken straight ahead; the camera is immediately turned through an angle of 45 degrees to the right and another photograph taken; and then to 45 degrees to the left of the line of flight and a third photograph is taken. As can be seen from the photo on page 130, these three views overlap slightly. Three more views are taken in exactly the same manner after the airplane has advanced approximately $2\frac{1}{2}$ miles along its flight course.

Of course, the resulting photographs show the ground in perspective and cannot be used for mapping purposes without first correcting for perspective. This is done by ruling a grid in a perspective corresponding to the photography and then laying off a coördinate sheet to the proper scale. (See illustrations on pages 128, 129, 130.) If the perspective grid is on a transparent substance like glass or celluloid it may be laid over a photograph and the physical features shown in the photograph transferred to the coördinate sheet square by square. The various areas covered by the individual photographs are then assembled on strip sheets and the strip sheets assembled into maps covering the desired area or into atlas sheets of a predetermined size. During the process of transferring to strips the detail is coöordinated with ground control points which are located either by astronomical observation, stadia surveying, or triangulation. In this way the resulting map is kept within the desired limits of accuracy.

The oblique method has the advantage of requiring a relatively small amount of field work and, therefore, is inexpensive compared with vertical surveying. However, it is not so accurate and can be used only in flat country. In Canada it is used in the low regions where the mean variations in altitude are not more than 150 to 300 feet. Over rough terrain the system would obviously be inaccurate as high points would be shown incorrectly on the photographs and the resulting maps.

Canada has developed the oblique method to a high state of perfection and it is ideally suited for her conditions, although it has not as yet been adopted extensively outside the Dominion. Credit for the development of this oblique system, as well as for much other Canadian aerial surveying pioneer work, must go to the late Dr. Déville, Surveyor General of Canada. His pioneering efforts have been ably carried on by Athos M. Narraway, '14, who is Chief Aerial Surveys Engineer of the Department of the Interior of the Dominion Government, and in the department of J. D. Craig, Director General of Surveys for Canada. Actual flying operations are accomplished by the Civil Government Air Operations at the Department of National Defense of Canada which is headed by Group

Captain J. L. Gordon. From an office in Ottawa the department directs the movements of 22 airplanes, the crews of which throughout the summer season, are engaged in mapping operations, mostly over uncharted and unexplored areas. During the period from 1920 to 1929, 100,360 square miles were covered by vertical photography, and 238,715 by oblique, or a total of 339,075. In all, 355,585 photographic exposures were made.

These figures can best be appreciated by the statement that in 10 years Canada has covered an area one-fourth as large as the U. S. Geological Survey has covered in a period of 50 years. Since its founding 46% of the area of the United States, or 1,331,787 square miles, has been topographically mapped and progress is being maintained at the rate of 17,000 square miles per year. The use of ground methods serves to plot the topography more accurately, but they cannot secure the great masses of detail given by a photographic survey and, at the present rate of progress, the map of the entire United States will take 90 years to complete.

To cover the 17,371 square miles that the United States Geological Survey covered in 1929, it had 200 parties in the field. On the other hand, Canada had only eight photographic units to cover 74,655 square miles during a single season. Each unit consisted of two airplanes and two cameras with about six men to a unit. Of course, there were various ground survey parties in the field to furnish the control data necessary in compiling maps from the aerial photographs but much of the control data is taken from existing maps and often astronomical observations are used. The areas being surveyed are so remote from triangulation or other positive ground control systems that it is impossible to carry the control to the location.

The unit is under the command of a flight lieutenant who is a pilot and, in addition, the personnel consists of two sergeants who are also photographic pilots and one mechanic or air engineer as they are designated in Canada. Each of the two cameras has two different cones embodying lenses of different focal lengths. It is customary for a unit to have cones containing lenses of 8- and 12-inch focal lengths. The two different cones are necessary as a unit is often required to work on different projects where conditions require photography at varying scales and altitudes. The cones are readily interchangeable, and a complete change can be made in five minutes. Each camera is equipped with five extra roll film magazines, and these magazines can be loaded with film and carried into the air ready for use. It is only a matter of a few seconds to remove one magazine from the camera and substitute another completely loaded, thus obviating the necessity of daylight loading in the air. Other equipment consists of tool kits, trunks, camera sights, oblique mounts, tripods, and swivel bases for the oblique mounts, special mounts for taking vertical photographs, filters, view finders, dark room tents, switch boards, signal lights, photographic timers, drift indicator disks, etc. Most or all of this equipment must be transported to the temporary base of the airplane.

A few of the requisites of a photographic airplane are absolute longitudinal, latitudinal, and directional stabil-

ity at all speeds and altitudes, a high ceiling, ability to climb to ceiling rapidly, great cruising radius, excellent visibility including a window in the floor so that the pilot can see the ground under him, reliability of airplane and engine permitting operation over wilderness country and extreme ruggedness. Most photographic missions are carried on in inaccessible regions hundreds of miles from the base of supplies or repair stations. The plane must fly without fail on every good photographic day as such days are at a premium and every one must be utilized.

Flying boats and amphibians are used for the oblique photography since it is necessary to mount the camera in the nose of the airplane. Pusher propellers instead of tractors make such a mounting possible. Furthermore, the boats and amphibians used are of the open cockpit type and this feature is necessary for oblique surveying. For vertical surveying the camera is mounted on the floor as shown by the photograph on page 128.

Aside from the United States and Canada there exists abundant evidence of the onward march of aerial surveying. Besides the mapping of Northern Rhodesia the Aircraft Operating Company, Ltd., has an 11,000 square-mile project in Zambesi. A companion British company, Air Survey, Ltd., during 1929 carried on programs in India, the Straits Settlement and Egypt. The work in India involved cadastral surveys (i. e., surveys to facilitate the collection of land revenues) of approximately 2,500 square miles at six inches to the mile; surveys for the Indian railways and for governmental irrigation operations; municipal maps for the City of Indore and the Port of Calcutta. In the nearby Straits Settlements Georgetown, on the island of Penang, was mapped.

Extensive operations have been carried on by Brazil, including air maps of Rio de Janeiro, São Paulo and other centers. The maps of Rio were completed in three years whereas ground methods alone would have required ten years. Also Chile contemplates a governmental survey of much of her territory.

But, in Iraq, an air survey of 1,500 miles for irrigation and agricultural purposes has disclosed a new by-product. There in Mesopotamia, the utility of aerial photography is being made apparent to assist archeologists engaged in probing the remains of the ancient civilizations of the Tigris and Euphrates valleys.

The five-year plan of Soviet Russia calls for a gigantic aerial surveying program. Their conditions are quite similar to those in Canada and there are vast areas in Soviet Russia, particularly in Siberia, which are without any maps of any description.

The original five-year plan of the U. S. S. R. calls for 140,000 square miles to be mapped from the air during 1931-1932 with an even greater amount of territory to be covered during 1932-1933. But the five-year plan is being speeded up and it is the present plan of the government to accomplish the entire five-year program in four years. This means that the areas to be covered during the next two years will be even greater than those called for in the original plan. The Russian program calls for even more surveying from the air than that of Canada which heretofore has been the most extensive of any nation in the world.

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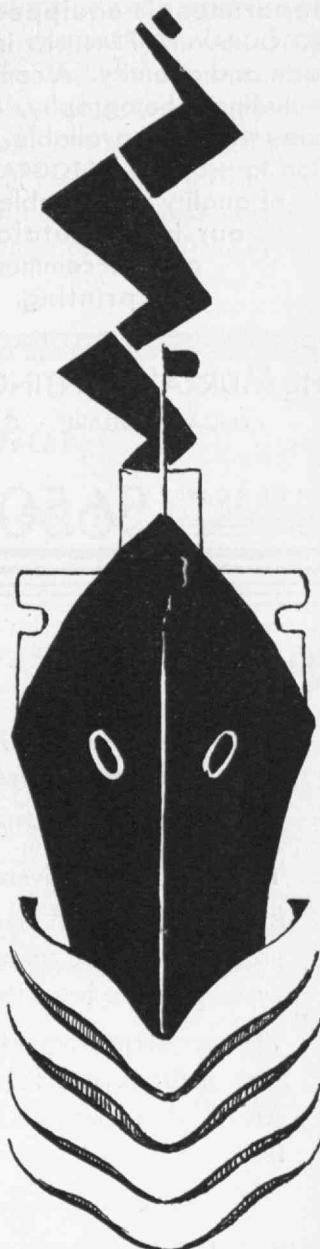
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RADIO'S GROWING PAINS

(Continued from page 126)

Congress did not take into consideration any engineering matters pertaining to the phenomenon of radio transmission. It was based almost entirely on the theory of states' rights. Going from east to west, the per-square-mile population decreases; therefore, radio service decreases by Act of Congress as you travel from New York to San Francisco. This, of course, was not what Congress had in mind. As an example of how this works out, it may be stated that one small eastern state has 12 times the radio facilities of a large farming western state. The farmers in the western state are far more dependent on radio facilities than are the residents of the eastern state, devoted largely to manufacturing. It is absurd that they should be given but one-twelfth the service of the eastern state.

In fairness to the Commission in its delay in making the reallocations, which delay brought about the Davis Amendment, it should be stated that the original Commission was set up only as a temporary body, lacking in funds, and perhaps unwelcome politically. It did not have the necessary legal advice, and the Commissioners questioned the very legality of their existence as pertaining to many of their duties. In fact, only during the current term will the Supreme Court pass on the validity of the Radio Act of 1927. The essential question is whether the right to use a broadcasting station is a vested property right which cannot be taken away by the Federal Government without just compensation. The point is brought about by the question, did Congress by the passage of the Radio Act of 1927 have the power to terminate all broadcasting rights, except under a license granted by the Federal Radio Commission?

In the last session of the present Congress authorization for an adequate engineering division of the Federal Radio Commission was given. A real attempt is now being made to provide a plan for the proper allocation of radio facilities throughout the country. There should be a real improvement in the near future. Preliminary steps were taken to make changes that would bring about such improvement, but immediately, a station involved in the reallocation brought suit to retain its present assignment. This completely tied the hands of the Commission, so that no new reallocation will be made until this suit is tried.

The Supreme Court recently rendered a decision that was most helpful to the Commission. Previously, the Court of Appeals had not only considered that it might pass on points of law, but went so far as to interpret these points of law as to passing on the regulations of the Federal Radio Commission to the extent of making specific station assignments when the Court decided in favor of the broadcast station appealing to it. This assignment of frequencies to stations by the Court of Appeals has been denied.

One of the most perplexing problems at the present moment is that of the power used by broadcast stations. This all goes back to the fact that by international agreement there are only 950 kilocycles available for North American broadcasting. It has been found necessary to allow ten kilocycles between (Continued on page 154)

Mr. Gerard's 64 "Men Who Rule the U.S.A." — Do They Take The Wall Street Journal?

EVERY newspaper reader is familiar with Mr. Gerard's recent list of 64 men "who rule the United States". The use of the word "rule" is of course a figure of speech. It would be more accurate to call these men leaders of business in the fields of credit, communications, transportation, electric power, basic raw materials, entertainment, and labor.

As a matter of testing our claims of The Wall Street Journal's capacity to render a valuable service to business and financial executives, we checked Mr. Gerard's names and the companies they represent against our list of subscribers and found 61 out of the 64 "rulers", or their companies, subscribers for The Wall Street Journal. A score of 95.3% subscribers among a recognized list of business and financial leaders is a record which few other publications can even approach, let alone equal or excel. Of the only 3 of Mr. Gerard's "U. S. rulers" who are not either individually or through their companies represented on our subscription list two are labor leaders, and one has extensive forestry and lumber-rather than directly financial-interests. Eliminating the two labor leaders and reducing the list to 62 our check-up shows 61 out of 62 business and financial leaders or their companies subscribing for The Wall Street Journal. A score of 98.3%!

Mr. Gerard's list is reprinted below

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RADIO'S GROWING PAINS

(Continued from page 152)

stations; therefore, the number of channels is immediately limited. Deducting those assigned exclusively to Canada there are only ninety channels, including Canadian-shared channels, which are available to the United States. There are approximately 600 broadcast stations, and pending are applications for new stations. One high-powered station, which at the present time means approximately 50 kilowatts, will render that channel useless to other stations. If all stations used this power it would be necessary to cut the number of broadcast stations very materially. The exact amount of the cut cannot be stated, because all the present 600 stations are not permitted to operate on full time. As ten kilocycles is not sufficient separation for 50-kilowatt stations located near together, it is doubtful if more than 75 broadcast stations would be possible in this country if they all used 50 kilowatts of power.

The Commission has before it the question of the advisability of limiting the number of broadcast stations to this number or to permit a much larger number of stations to operate, most of which would be required to use small powers, that is, not over 0.1 kilowatt. Various canvasses of listeners have been made. They in general tend to show that high-powered stations, putting on the very best programs, using chain systems, are preferred. Many local communities, however, have their own favorite local station, therefore, there is no unanimity of opinion.

Suppose that the listeners did agree on the plan of a very limited number of high-powered stations, and that the Commission put such a plan into effect. From existing experience, it is evident that the ownership of these stations would be in the hands of a very limited group. Is it wise to place such a potential force as radio broadcasting in the hands of any one group? In all analogous cases, public sentiment has not favored such a concentration of power.

The limited radio facilities make it impossible to assign full time to many stations. The very high cost of station equipment for stations capable of putting out the very best in programs makes it uneconomic to operate on part time. Furthermore, licenses are not transferable, so that two half-time stations may not combine their facilities and operate as a single station, without authority from the Federal Radio Commission. There is always the question as to whether it is for the public interest to permit such combinations.

The broadcaster is in a most hazardous position. His license, by act of Congress, has been issued for a period of ninety days, at the end of which time he does not know whether or not his entire equipment will be rendered valueless through the refusal of the Commission to renew his license. Should he expand his plant, and give the public better service? It has been a hazardous thing for him to do, without some assurance that his station would be in operation for more than ninety days. The Radio Commission has taken a very sane attitude on this problem, and in spite of the perplexing problems involved, has tried to administer the Radio Act not only for the public convenience and necessity as it is required to do, but with human consideration for the broadcaster.

(Continued on page 156)

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RADIO'S GROWING PAINS

(Continued from page 154)

During the last session, Congress amended the Radio Act of 1927, so that the Federal Radio Commission is empowered after January 1, 1931, to issue broadcast station licenses for as long as three years.

The broadcaster has other problems than that of retaining his license. There may not be played from his station any piece of copyright music without paying a fee to the copyright owner. He, therefore, must check every piece to be played by orchestras engaging the facilities of his station. He is, however, primarily interested in maintaining a large listener interest; therefore, he does take out a license, and sees that the copyright fees are paid. But what of the programs when they leave his station?

If the proprietor of a hotel or other public place picks up these programs for the entertainment of his guests, must that proprietor in turn pay a second copyright fee? The owners of the copyrights have insisted that he should, and have brought suits to enforce such payments. The Supreme Court at the present time is considering, among four similar questions, whether "the acts of a hotel proprietor, in making available to his guests, through the instrumentality of a radio receiving set and loudspeakers installed in his hotel and under his control and for the entertainment of his guests, the hearing of a copyrighted musical composition which has been broadcast from a radio transmitting station, constitute a performance of such musical composition within the meaning of 17 USC Sec. 1 (e)."

This matter is of great importance, because if the Supreme Court should rule in favor of the owner of the copyright, there will have been fixed no limits as to how far the term "public performance" may be extended. It may even come to the point of extending to homes when a radio program containing copyright music is played before a group other than the ordinary and usual residents of that house. It is a problem of vital interest to the radio industry.

In the protection of their own interests, unions have always bitterly opposed the extension of any appliance tending to decrease the employment of its own group. The improvements made in electric recording and reproduction have made it possible to place music on the air through a radio station, the quality of which is essentially equal to that of the original. Many stations use such methods of producing programs during the morning hours. The listeners as well as the owners of the stations feel that their interests are better cared for by mechanically reproduced programs from the best orchestras than by listening to programs by local talent.

The musicians' unions have claimed that this infringes on their rights, and in several cases have insisted that the man operating the reproducing (Concluded on page 158)

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RADIO'S GROWING PAINS

(Concluded from page 156)

device, which requires only the same skill as that of playing an ordinary phonograph, be a union musician, and be paid as such. Radio has, however, provided additional employment for many musicians. It has increased their working hours, rather than decreased them; therefore, it is felt that his union problem may be solved without much difficulty or inconvenience to the public interest.

While the engineering and economic problems confronting the radio industry are of great magnitude, such a condition would be expected in any industry which, within a decade, has grown from an annual business of but a few million dollars to one of a billion dollars. Radio is today one of the nation's important activities. It has a wide public interest. Such classes of business have in the past always been able to bring about a solution to their difficulties, and radio should prove no exception.

THE ANATOMY OF X-RAYS

(Concluded from page 132)

Gillette safety razor blade, but without success. Had he used instead of the safety razor blade the edge of any crystal, as for example, quartz or rock salt, he would have found that the x-rays passing through it would be deviated in a great variety of directions, and would form a complicated pattern on the photographic plate which was used to indicate their destination. It was just such a complicated pattern on a photographic plate, produced by a beam of x-rays passing through a crystal, which led the three German scientists mentioned above to the first proof of the wave nature of x-rays and to a measurement of their wave length.

When one considers that this important and varied series of practical applications and scientific discoveries have followed as the result of the curiosity of a few scientifically trained men, and that this is but one of a great number of similar developments of the past generation, one cannot but wonder at the possibilities which still lie open in the future.

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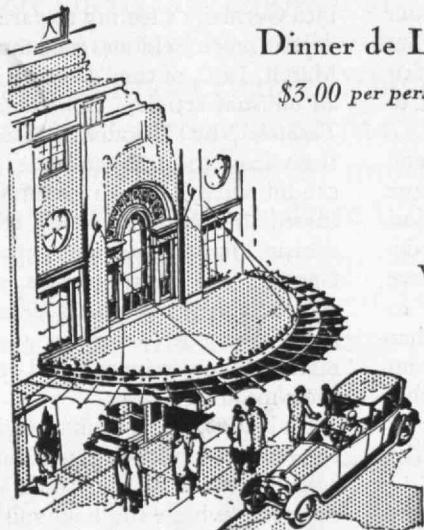
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AMERIKANISMUS

(Continued from page 134)

this and that famous American project. An article in the latest number of a prominent weekly devoted two pages of illustrations to the topic "What a German would find highly inconvenient in America" — an example or so will suffice: the hotel night-table containing *only* a radio set and an unhandy form of telephone; the one-arm quick-lunch chairs "made purposely as uncomfortable as possible so that the guest will be glad to leave as quickly as he can and make room for the next!"

So much for the feeling that shows on the surface. It seems bitter, unfriendly, almost insulting at times, but if we consider once again our earlier discussion as to underlying causes, the whole resolves itself into what is, really, envy, jealousy that such an adolescent nation can without effort take her place in the world while she, Germany, is chained almost to a standstill. What she says and publishes is not for us here across the seas; it is for herself, an attempt at self-consolation. Yet we are still apt to take offense at this effrontery, we are prone to forget that the German may speak heatedly but very seldom emptily, and that there is a kernel of truth, whatever his underlying purpose may be, in every fallacy he finds in us. It is equally childish and useless for us to call bad names in return or to hold our fingers in our ears; these fallacies are after all our fault, and at that not beyond repair.

Our migration every summer to do Europe in eight or ten weeks has played an undue part in branding America as a country of unbred, common, money-made people. Our tourists may be typical of our nation — surely Europe has every cause to draw this conclusion — but heaven help our land if they are! Picture a crowd of loud-mouthed, carmine-lipped women thumbing over every bit of lace or jewelry in a shop — "No, we aren't buying, just looking!" Picture the throngs at the "American" bars, tanking up till the next trip across. Listen to the sniffs of disdain at an old cathedral that has withstood the test of centuries — "Who ever built the way *we* are doing?" Yes, indeed, Europe caters to us; we have made Oberammergau the commercialized production that it is; we keep scores and scores of towns in business by our annual visits. They cater to us — that is business; but respect is another matter — what barker at a county fair ever respected the throngs that filed from one exhibit to the next?

Behind this conscious and justifiable belittling and ridicule and wholesale criticism, there is a far more respectful feeling, *but for the land, and not the people!* Liesl admits she would go across immediately were the opportunity offered. Scores of students and young engineers have asked me what chances they would have were they to seek their fortune in our country. Not a family but what has relatives or friends already settled in the States, from whom come glowing tributes to the opportunities of this land of promise. But beneath it all is a trace of doubt — Liesl phrased it rather aptly when she ventured, "I'd like to work there — but live here."

No doubt Liesl was only repeating the ideas of another, and would find America a perfect paradise of amusement; we cater particularly to minds like hers. Therein lies

what the German considers the distinguishing feature between our two worlds: we have developed Civilization, they, *Kultur*. We live a perfected, systematized, bodily and sensually luxurious existence at a tremendous pace, seeking with ever greater speed a goal whose nature we do not even bother to wonder about; that is Civilization. They feel they have long since found their goal — the finer cultivation of the mind — and they can enjoy their higher life without haste. The German visitor in America misses his accustomed leisure in which to appreciate life. The American in Germany curses the lack of conveniences.

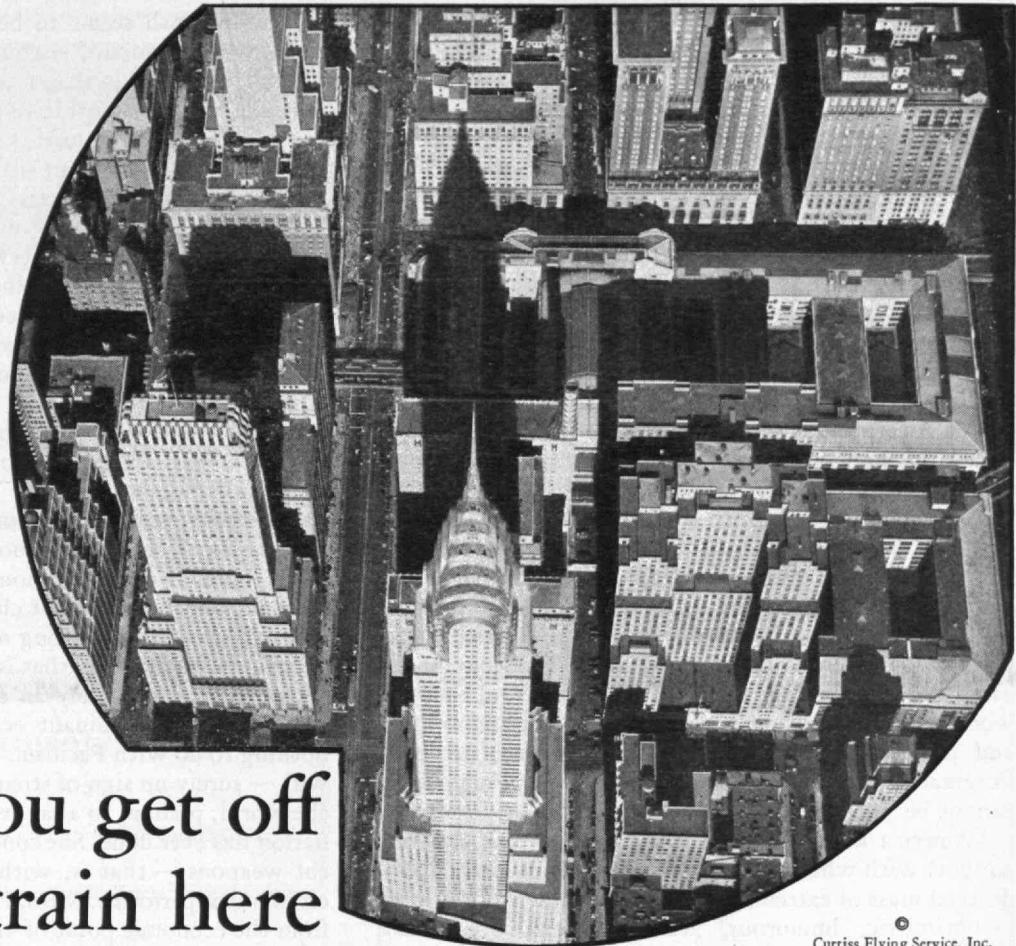
So, be it strictly true or not, we have given the Germans good cause to believe that the United States is a land of wealth and wealth worshippers. How can they believe otherwise? Tourists fairly reek with money, or try to give that impression. Press reports are profuse in their tabulation of huge American financial transactions. An expenditure of hundreds of thousands is sheer waste and display in the light of the German's forced thriftiness. Luxuries to a German are things he has learned to do without, yet to an American they have become the very mainstays of existence. With reports of the recent market panic and unemployment menace in America, Germany almost gasped; the U. S. A. in financial trouble? The rumors continued to come, but so did the tourists and the reports of huge expenditure and business deals. Hence our money crisis is largely a myth to the average German mind and America is still the land of millionaires.

To the German it would seem that we have the horse and cart most assuredly in reverse order: had our wealth been the obvious result of leadership in education, science, and the arts; or even had the growth of all been more simultaneous, it would have been respected. But financial prestige came first, and what nation could not buy the rest once given sufficient resources? Perhaps the respect for more than our wealth will follow in the course of the years, but only when the German race begins to feel that America is producing from its *own* talent, and not buying from the rest of the world.

FROM the surface matter, the self-alleviation of her wounded pride by ridicule, we have gone a step deeper into Germany's feeling toward us; but there is yet greater depth more seldom encountered. In the number for March, 1930, of the "*Deutsche Rundschau*" I chanced upon an unusual article, "*Amerikanismus als Schlagwort und als Tatsache*" by Theodor Lüdecke. He has departed entirely from the usual attitude, and in unbiased writing, so candid with his own countrymen that America is discussed in almost flattering terms, he analyzes "Amerikanismus" in its actual and hypothetical influence upon the German race. He too writes, not for us, but for his own people; yet, though his general theme as applied to Germany does not concern us at this time, many of his remarks are so pertinent that I quote a number as I translate their meaning.

He begins, "The term *Amerikanismus* is today almost at the center of every explanation of political, economic, or cultural questions. The commanding political position of America, which she has won directly through her economic powers" brings forces to bear which "influence the destiny of us all to an ever greater (Continued on page 162)

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AMERIKANISMUS

(Continued from page 160)

degree. . . . We have no longer the definite choice of acceptance or refusal — the American forms of life are, through economic channels, simply forced upon us."

But he notes rightly that what Germany terms *amerikanisch* is often far more "Americanized" than the original — modern youth, for instance — and develops the interesting thesis that "Americanization" is simply a process of national evolution, that the United States happened to reach this stage before the rest, and that "Americanization" would just as surely have come about had the U. S. A. never existed!

The American, as such, is in his life-force still younger than the European, but in his methods of living and working already far older. Why? Because we are not, like European states, the direct product of centuries of development; we took instead a strength and self-dependence from Europe to a land of endless resource, a land filled with the challenge to be conquered. "But no thought of self. No consideration for matters without direct practical value. There is not time for that. This part of the earth can only be conquered through toil. And thus did work become the leading principle of American religion and philosophy. This the German philosophers term Pragmatism and do their best to refute. But Pragmatism cannot be 'refuted'"

"America knocks at our door. What is this America anyhow with which we have to do? It is basically an industrial mass of extremely lively, adaptable youths, who — optimistic, humorous, athletic — seize every task within possible reach, are without limit in endurance, and feel themselves equal to every situation. Perhaps they are, in the words of a German professor, uneducated in the higher sense (*höchst ungebildet*), but they are, however, thoroughly trained (*gut durchgebildet*) — physically as well. They are at least well enough educated to buy up our German factories."

Our abnormal addiction to sport has not been without its marked result. He remarks that the Americans, from laborers to business directors, taken as a whole, are more in form than the inhabitants of almost any other land. An American 'stands out' when he strolls through Berlin. He is radiant with an energy that everyone notices. "Wie kommt denn das?"

"The American features are freer from care. In no land in the world is there so much laughter as in the U. S. A. Granted — the American has it easier; the natural opportunities of his land offer an almost boundless field of activity. He permits no damming-up of his intellect. European visitors frequently affirm that America is problemless. Little wonder. When the whole land is 'in form' . . . when the people and the conditions are healthy, then even the unsolved problems are trifles. The people live intensively; they live not only with the head, but with the whole body. They have so great a surplus of life-force that it often takes the form of childish gayety. One is always surprised anew at the natural freshness that the American spirit shows."

But he does not deny that there exists in America a certain monotony, and that directly on that account the higher classes seek closer connection with Europe, where

a great warmth seems to be given forth. To him it is clear that the robust instinct of our early pioneer, his natural freshness, is already on the wane.

His views on comparative politics should be encouraging to us to say the least. One returning from America and viewing the German situation, he observes, is wont to quote Romain Rolland's "Too many clever minds are busying themselves with the State." As a German voter once remarked to me, "Every German wants to have his say in politics; you Americans are wise — you leave it to the politicians." Lüddecke continues, "Men who otherwise understand each other very well, become irate once the discourse touches on politics. Talk begets neither potatoes nor automobiles. . . . America has developed herself through work." Nothing can satisfy all parties as well as a "rational production of new products, through which all pull on the same rope. That is basically the secret of the American economic morale. . . ."

"In other words, the economic attitude of mind has so taken hold of political thought, that politics have received an entirely different character. America maintains a strong army and a strong navy — however, when one talks in terms of peace, that is no empty way of speaking. This attitude is entirely an outgrowth of the American principle of predominant economic thought. This has nothing to do with Pacifism. Pacifism is — say what one will — surely no sign of strength. America is conquering the world, perhaps to a far greater extent today than any nation has ever done. She conquers, however, with different weapons — that is, without weapons, by means of economic superiority. Militarily she lies on the defensive; from the economic point of view she is absolutely on the offensive."

If we are content to be typically American, and neglect to fill in the countless little "exception" sub-headings which Herr Lüddecke has left for us in his somewhat rosy outline or correct his obvious errors, we may now smile a bit triumphantly. "Herr Lüddecke has found us the greatest nation of all times, and he's not so far wrong at that; we're showing the old world a thing or two in greater business methods." Ha — "money-chasing people"! "What," asks Lüddecke of his own nation, "is the use of all the cheap patent ice-chests and automobiles, when the spine of the *Volk* is crushed? The economic moment can be for us only the means — never the end."

But what is it to America? If only a means, then to what purpose? Is there a single soul in our nation who knows why we strive, why we build, why we live at our tremendous pace? Was Liesl far from the truth when she branded us as merely "money-chasers" — have we a greater goal in mind than what the dollar signifies? No doubt the reader will balk a bit at this point; "It's not the dollar we're after; it's Progress!" Good enough; but whither?

Lüddecke tells of the technically-inclined Englishman who read Goethe's "Faust" to the end, and then exclaimed triumphantly — "Yes, but the German Faust died as an engineer!"

At the moment that is the most a great many of us would think to wish for. "Decisiveness, magnitude of vision, the joy of doing, and cold calculation in economic matters — America teaches these," says Lüddecke. Perhaps we in turn can take a lesson (Concluded on page 164)



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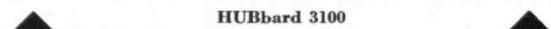
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AMERIKANISMUS

(Concluded from page 162)

or so from Germany. "We have all that we need, and more than we can ever use. We have large bank balances, villas, autos, yachts — the one thing we lack is — Time! Our minds are fixed on production. And now the whole machine is dragging us along. When our nation was young, perhaps we would have willed it otherwise — now that it could be otherwise, we have lost the will to change."

Lüddecke may be right, that it is only the will we have lost; and we are so imbued with our doctrine of Progress, and all the mass production, luxury, speed, and accompanying pursuit of the dollar that the term embodies, that we long for nothing more. Or it may be that we have lost, not only the will, but moreover the ability, to discover in life the intangible fineness that we have obscured with our maze of practical contraptions. The *Northerman* spinster once told me that the *Kultur* of her country was built upon the foundation of the Latin and Greek languages; a late American engineer of world repute decried the impractical mind of the German professor who devoted a lifetime to translating the Latin Classics into ancient Greek. Both views are a trifle ludicrous, but they symbolize beautifully the conceptions of two narrow worlds. America is already the arrogant possessor of one-half the apple of greatness, yet blind to the fact that the other half is missing.

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BOOKS

(Continued from page 144)

connection with his studies on Arabicalchemy. On the other hand, the chapter on "Scientific Philosophy and its Outlook," pages 445-492, is clear and masterly, and can be studied with profit by all who are engaged in the pursuit of science.

The American edition differs only by minor changes from the English edition of 1929. Its price is two dollars less, but it is not as easy on the eyes for it appears to have been made from the English edition by a process of photographic reproduction. TENNEY L. DAVIS

Essays on Modern Magic

THE SCIENTIFIC AGE, by Dugald C. Jackson and W. Paul Jones. \$2.00. v+353. New York: John Wiley & Sons.

IN THIS volume Professors Jackson and Jones, both teachers in the Speed Scientific School of the University of Louisville, present 23 previously published essays all having more or less to do with "this scientific age." Although the book is intended to be used as an English text in engineering schools, it should enjoy popularity with a general audience interested in science but not too well informed in that modern magic. The essays range in value of content from Michael Pupin's description of how he made good in a big way as a Columbia undergraduate to Bertrand Russell's masterly ten-page exposition of materialist philosophy. They have their ups and downs between these two points, the somewhat infantile styles of some of the popularizers being balanced by good papers from Stuart Chase, Paul de Kruif, H. G. Wells, and other able writers. On the whole, the authors seem well chosen; but Hendrik Van Loon and Albert Edward Wiggin could profitably be traded for Julian Huxley and J. B. S. Haldane, who are excluded.

To this reviewer it seems that Messrs. Jackson and Jones are working on a false hypothesis. Experience has shown him that Edwin Slossen, Paul de Kruif, and their kind will be avidly read by engineering students without any guidance or prodding from the English department. What they should be given, in what is often the one "arts" course they take, is an introduction to the type of literature they would normally not deign to examine. Many an "arts college" boy has been dragged kicking and struggling to the science department for a forced feeding of chemical or biological learning, only to find on closer acquaintance that there was something there worth his time and worthy of his interest. "What's sauce for the goose is sauce for the gander!"

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ADVERSARIA



Concerning Russia

¶ The following incident described by RUSSELL W. AMBACH '24, shows the ridiculously high duty placed on imports to Russia. "While living in Kharkov, Ukraine, U. S. S. R., during seven months of this year, I received several packages sent from the United States and Germany. I had heard of the tremendous duty placed on imports, but had it very forcefully brought to my attention, when I was called upon to pay about \$45.00 duty on two pounds of tobacco sent from the United States. I thought that you might be interested in the enclosed notice from the Soviet Postal Authorities, informing me of the charges.

(Translation)

To whom — Russell Ambach

Address — Giproschacht

Package from America

Postage, 20 kopecks (about 10¢)

Duty, 90 rubles, 50 kopecks (about \$45.00).

"For some unknown reason, they failed to charge me the customary \$1.50 for repacking at the Customs House. I thought that some of our worthy Alumni contemplating work in U. S. S. R. might use this little incident in determining their salaries."

Further Comment on Technology Colors

¶ In the October issue of The Review, CHARLES R. FLETCHER '76 told of the origin of Technology's colors. Since the publication of this, we have had a letter from HARRY C. SOUTHWORTH '77, with which we shall supplement the previous notes. "In a recent number of The Review, I note that Mr. Fletcher '76 has something to say about the adoption of the Technology colors. I hope the discussion will continue until all four classes interested in the matter receive their full credit. As the colors were adopted more than a half century ago, the matter should be settled soon.

"Those who attended the All-Technology Reunion some 20 years ago at Nantasket, may remember that '78 claimed the honor of selecting and adoption. I think they carried a banner making that claim as we marched in military order by classes, down the sands of the beach. Mr. Hale, the Secretary of '77, said he intended to write The Review giving full credit to all concerned in the interest of historical accuracy, but I think he never did so. Mr. Hale has passed away and so also Mr. Walter Jenney who took great interest in matching colors.

"I remember an interesting incident. A young ladies school in Pennsylvania was found to have adopted the same

colors as ourselves. A discussion arose and it was decided that a ladies school was so different from Technology that no conflict would arise if both had the same combination. We decided to stand by our colors. I do not remember whether the fourth class was that of '75 or '79. Let us hear from other participants."

Awarded

¶ To ARTHUR D. LITTLE '85, the 1931 Perkin medal for outstanding achievement in the chemistry field. Mr. Little will be presented the medal at a joint meeting of the chemical societies on January 9. The medal winner each year is selected by representatives of five leading chemical societies.

¶ To JOHN H. GREGORY '95, and two other members of the Society of Civil Engineers the 1930 James Laurie Prize for their paper entitled: "The O'Shaughnessy Dam and Reservoir." Mr. Gregory is a member of the faculty of the Engineering School of the Johns Hopkins University and is serving the Public Improvement Commission of the City of Baltimore as consulting engineer on the design and construction of the Prettyboy Dam. Each year the American Society of Civil Engineers awards two prizes for the two best papers printed in the transactions of the society. With the award of the James Laurie Prize, Mr. Gregory will have received both prizes, as he was awarded the Thomas Fitch Rowland Prize (the other prize) in 1910 for his paper entitled "The Improved Water and Sewage Works of Columbus, Ohio."

¶ To CHARLES W. HAWKES '05, the silver trophy offered by the Direct Mail Advertising Association. The award was made at the national convention in Milwaukee. Mr. Hawkes is New England representative on the managing committee of the National Council of Business Mail Users.

¶ To PER K. FROLICH '23, the 1930 Grasselli Medal for his work on synthesis under high pressure. The presentation of the medal was made at a joint meeting of the Chemical Societies in New York on November 7.

Elected

¶ GRENVILLE T. BRIDGMAN '08, to an honorary membership of the Chemical, Metallurgical, and Mining Society of South Africa.

¶ THOMAS C. DESMOND '09, State Senator of the Orange-Sullivan district of New York. Mr. Desmond was the only Republican to carry Sullivan County. He has long been active in New York State Republican politics.

¶ JAMES A. TOBEY '15, to the Vice-Presidency of Delta Omega, the honorary

public health society, at the annual meeting held in Fort Worth, Texas, on October 29.

A Note on General Logan Feland

¶ On October 31, three decorations were added to the long list of medals bestowed on MAJOR GENERAL LOGAN FELAND '92, commandant of the Department of the Pacific of the Marine Corps. At ceremonies given by the French and Nicaraguan governments, General Feland was presented the City of Verdun Medal for his heroism in the Verdun sector as a colonel in the Second Division during the World War. The Nicaraguan Presidential Medal of Merit and the Nicaraguan Medal of Merit were also bestowed as recognition of his services as commandant of the marines in the Central American Republic in 1927-1929.

Ross F. TUCKER '92, writes the following of General Feland: "At the outbreak of the Spanish War he was working in my office. Forthwith he disappeared — joined a Kentucky regiment — and served through the war, from lieutenant to major. Then he was given a commission in the Marine Corps, went to China (I believe during the Boxer Rebellion), to the Philippines, Panama, and other places. He became the famous Colonel of the 5th Marines — S. S. M. and the *Croix de Guerre* at Chateau Thierry. And here he comes again! He was the last man in the world that you would ever have picked out to be a soldier — a tall, skinny, slouchy Kentuckian, who couldn't be serious three minutes at a time. I guess he would be a hard man to induce to talk about himself, but the files of the War and Navy Departments would tell."

Invented

¶ By DANIEL F. COMSTOCK '04 and LYMAN F. WHITNEY '09, a process by which boiling mercury may take the place of electric motors and pumps in home refrigerators. The machine is called a stator because all moving machinery has been eliminated.

Warning

¶ A man representing himself as the son of a member of the Class of 1896 has been going about the country borrowing money from various Technology men. Technology Alumni are warned that this man is playing a con game and that he is not an alumnus of the Institute. Obviously, he has obtained a Register of Former Students and is using it to obtain the addresses of Technology men from whom he might borrow money under false pretense.

In the News

C CHARLES HAYDEN '90, by driving a rivet in the construction of the new Waldorf-Astoria Hotel in New York. Mr. Hayden has also been honored recently by being consulted by Hoover for advice on matters in the financial and industrial world.

C WILLIS R. WHITNEY '90, by having an article written about his scientific research work, in the *New York Times Magazine*, November 2.

Delivered

C By KARL T. COMPTON, on November 4, to a radio audience over station WEAF, an account of a recent x-ray discovery which may result in the production of entirely new types of useful plants. He said that if seedlings are exposed to severe doses of x-rays, they frequently develop into plants strangely different from the parent, constituting, in fact, new species with different appearance and properties, many of which seem to be self-perpetuating. He also remarked that there was reason to suspect that many of the new species recorded by geology in past ages were due to the x-ray-like gamma ray of radium present in the earth, and that the scientists of today were probably artificially reproducing these age-old changes. It is possible that by the application of this discovery new types of plants may be produced which will be of great value to agriculture. He told of experiments carried on with tobacco in which remarkable types have been created.

On October 31, Dr. Compton spoke for Science Service broadcasting in New York on "Adventures with Electricity in a Partial Vacuum."

C By FRANCIS J. CHESTERMAN '05, a paper entitled "Training Plant Executives" before the National Safety Council. Mr. Chesterman is Vice-President and General Manager of the Bell Telephone Company of Pennsylvania in Pittsburgh.

C By SIXTO E. DURAN-BALLEN '23, a report on the finances of Ecuador on July 10, 1930. Mr. Duran-Ballen is the Minister of Finance of Ecuador.

Edited

C By DUGALD C. JACKSON, JR. '21, in collaboration with Dr. W. Paul Jones of the University of Louisville, a book entitled "This Scientific Age." This contains 25 essays written by men of recognized scientific and literary ability and devoted to the non-technical aspects of this age of science.

Written

C By JAMES A. TOBEY '15, another book, "Riders of the Plagues." It is a vivid and accurate description of some of the worst plagues that have afflicted the world.

C By SAMUEL M. JONES '21, in collaboration with JOSEPH T. LUSIGNAN, JR. '24, an article appearing in the September 20 issue of *Electrical World* entitled "Impulse Ratio Limitations."

Attended

C GEORGE B. WATERHOUSE of the Technology's instructing staff, the meeting of the Iron and Steel Institute at Prague, in Czechoslovakia, September 15 to 20.

Appointed

C DUGALD C. JACKSON, JR. '21, Head of the Department of Electrical Engineering in the University of Kansas. He was formerly head of the Department of Mechanical and Electrical Engineering in the Speed Scientific School of the University of Louisville.

Deaths

C Reports have come to The Review since the last issue of the decease of the following:

C FREDERICK P. FISH, Life Member of the Institute's Corporation, on November 6, at his home in Brookline, Mass. Mr. Fish, a noted lawyer, was a member of the legal firm of Fish, Richardson, Herrick and Neave which has been general counsel for many large corporations. He was for many years President of the American Telephone and Telegraph Company. During his long and busy life Mr. Fish occupied many positions with large corporations and with educational institutions. He had been a director of the New England and Old Colony Trust Companies, a member of the board of overseers of Harvard University, Life Member of the Corporation and member of the Executive Committee at Technology, and a member of the Council of Radcliffe College. Two organizations to which he gave a great deal of his time were the State Board of Education and the National Industrial Conference Board, having served as Chairman of the latter.

C LOTT MANSFIELD '82, on April 11, at his home in Brookline, Mass. After completing his studies at the Institute, he was for some time associated with his father in the management of the family sugar plantation in Louisiana and as mining engineer in his father's mines in New Mexico and Arizona. At the time of his death he had been for over 25 years district manager for New England of the Crown Cork and Seal Company, still retaining his interest in the management of the southern plantation. He was much interested in athletics and at one time was the champion cricket player of the United States.

C HARRY N. WILLIAMS '92, on August 23, at his home in Hollywood, Calif. Following his graduation, he became associated with the Nickle Plate Route and devoted himself to intensive study of transportation problems. During the World War he was a major in one of the engineering corps attached to the staff of General Atterbury in France. Following the armistice, he was made President of the Interallied Commission in charge of railroad operations in the area of occupation, with headquarters at Coblenz, Germany. The major resided in Cleveland and Chicago much of his life. He went to

Southern California six years ago and became a prominent member of the Merchants and Manufacturers Association staff.

C OLIVER C. GRINNELL, JR. '97, on October 7, at St. Vincent's Hospital, New York. Twenty years ago Mr. Grinnell came to New York, where he founded the company bearing his name. He was said to have originated processes of lithographing on cloth, silk, and leather. Aside from his business interests, Mr. Grinnell was a fisherman of note, having set the swordfishing record.

C FRED B. WEBSTER '01, on October 12, at New York City. Mr. Webster served for many years in the Navy Department at Washington and at Seattle. He was editor of the *Shipbuilding Encyclopedia* and of *The Marine Engineering and Shipping Age*. Later he became President of the Marine Journal Company, and still later associated with *The Marine Age* and the New Jersey Asbestos Company. He was a member of the Shipping Board Fuel Conservation Committee, Maritime Exchange and the Propeller Club of the United States, Port of New York.

C JULES H. HIRT '01, on September 14. Mr. Hirt was a native of Belgium and came to this country at the age of 14, settling in New York where his earlier education was received. Since 1909 his headquarters have been in El Paso, Texas, where he was very active in his profession as mining engineer and metallurgist.

C RALPH E. THURSTON '02, on October 6, in Fall River, Mass. After graduating from Course VI, he located in Chicago with the Commonwealth Edison Company and later he was for a year with the Narragansett Electric Light Company in Providence as solicitor for power business. In 1906 he took a position in Putnam, Conn., with the Light and Power Company of that city, advancing in a few years to the position of manager. When the Putnam Company was absorbed by the Connecticut Electric Light Company, Thurston became division manager at Putnam. In addition to his work in the Light Company he served his adopted town as commissioner of Public Works and for many years as Chief of the Fire Department. His many public activities and his hearty personality made him one of the prominent citizens of Putnam.

C ROBERT D. FARRINGTON '05, on November 4, at the Waltham (Mass.) Hospital. Mr. Farrington died of injuries received in an automobile accident which occurred on the Boston Post Road in Wayland, Mass.

C FRANK E. DIXON '06, this past summer at Cuyahoga Falls, Ohio. He was Vice-President of the Falls Rubber Company in that city.

C ROBERT P. STEVENSON '07, on September 21, at his home in East Providence. At the time of his death he was associated with the Henry L. Scott Company of Providence.

C CLIFFORD B. BELLIS '18, on September 9, 1930.

C PERRY C. DAVIDSON '25, on September 26, in Cambridge.

NEWS FROM THE CLASSES AND CLUBS

1868

The Secretary of '68 contributes this: My cousin, who owns and lives in the old family mansion on the Kennebec River, just below Gardiner, Maine, and who has a large family of seven children, has a number of small sail boats, about 15 feet long, all of one dimension, and which furnish endless fun for the young people in racing up and down the river, according to the direction of the wind and the tidal current.

Last summer, we had crews for three boats, consisting of a boy and a girl for each boat except one of the three, which had two boys. As the wind came from the northwest, which is the most freaky wind we have, and as the tide was running out in the same direction as the wind, it presented about the worst set of conditions that we could have for a race. They beat around the bush for some time trying to make a fair and equal start, when one of the boats, in which one of the sons of the family had for his partner a visiting young lady, was capsized and filled full of water. The boat crew in this case, for some reason unknown, to the writer, had two big pans like dish pans aboard, and the crew immediately began bailing it out. They succeeded in bailing it out so quickly that they made the start almost with the other boats, and then by chance or superior knowledge of eddies and wind's freaks, succeeded in rounding the upper buoy and sailing back to win the race.

The moral of this race seems to be, that if you want to win the boat race, the first thing you want to do is to capsize your boat and have aboard of it two big dish pans for quick bailing. Provided in this way, you are sure to win the race! — ROBERT H. RICHARDS, *Secretary*, 32 Eliot Street, Jamaica Plain, Mass.

1882

Lott Mansfield, who for a year was associated with the Class of '82 as a special student in mining engineering, died at his home in Brookline on April 11, 1930. After completing his studies at the Institute, he was for some time associated with his father, Ashael Mansfield, in the management of the family sugar plantation in Louisiana and as mining engineer in his father's mines in New Mexico and Arizona. At the time of his death he had been for over 25 years district manager for New England of the Crown Cork and Seal Company, still retaining his interest in the management of the Southern plantation. He was much interested in athletics and at one time was the champion cricket player of the United States. He was one of the founders of the Boston Athletic Association and a charter member of the Longwood Cricket Club and its secretary for 16 years. Surviving are his widow and

his son and a daughter by a former marriage. — ALFRED L. DARROW, *Secretary*, 8 Beacon Street, Boston, Mass.

1888

Ned Webster satisfied a life-long desire to try grouse shooting in Scotland this summer, and although the trip occupied only about five weeks in all, he visited two friends who had moors in northern Scotland and another who provided partridge shooting in southern England near Southampton. Ned says that the shooting was good and that he thoroughly enjoyed every minute of his stay in both places. His own story follows: "The grouse shooting was over the moors, most of it in mountainous country. The ground was completely covered with heather, which at that time of year was in full bloom, so the whole hillsides were different shades of purple. It is a perfectly wild and rugged country, with no trees except where they have been planted, and we were particularly interested to see so much of this part of Scotland, as we had never been as far north before.

"The shooting over there is taken much more seriously and is more of a ceremony than with us, and as I am an indifferent shot, I was more or less worried that the game-keeper and others would be sore whenever I missed a bird. Although they had plenty of opportunities for this feeling, I never noticed it once and found the game-keepers and gillies uniformly courteous and sympathetic. In the beginning of the season we walked the birds up for a few days, but aside from that it was all driven grouse. The different moors have what they call "butts," which is the same sort of shelter we would call a "blind," and the beaters (mostly young boys) start a mile or more away and drive the birds over your head. Everybody shoots with two guns and each different man has a loader who passes you the second gun even though you have only fired one barrel from the first. The birds fly close to the ground and as the wind is generally with them, it makes quite difficult, but very interesting shooting.

"In between our visits we took a very interesting motor trip way up to the very northern end of Scotland, staying a short time at John O'Groats, where we could look across to the Orkney Islands and see Scarpa Flow, where the great English fleets were quartered during the war. We had the pleasure of making another visit 15 miles from Southampton where I had two very good days partridge shooting. This is in a cultivated country and was very interesting because it was so entirely different from the grouse shooting. We shot these birds mostly by walking through cultivated fields of vegetables or stubble, and every so often we would

have a drive. The English partridge is about half way between the size of a quail and our own partridge. There was pheasant shooting on this same place but as the season was not open, we could not shoot them but we started enough to have made wonderful shooting of the pheasants, as well as the good bag of partridges which we got on the two days.

"It was very interesting to see the different ways the head game-keepers handled the shooting in the various places. It really means quite an organization because besides the gillies and loaders, they have from 15 to 30 beaters for use when the birds are driven. I managed to get through the entire season without shooting one of my neighbors or a beater. This whole trip naturally kept me out of doors a large portion of the time, and I came back more refreshed than from any vacation of a similar length of time I have ever taken. I was gone only about five weeks in all."

Another of our classmates succumbed to the lure of summer travel in England as mentioned in the October Review, and although he gives the names of only 34 old English inns at which he put up, we are sure that Johnnie Runkle found "joy and romance" in every one of them. We will let Johnnie tell it in his own inimitable way: "So I will tell you that there are worse things in the world than a summer in England, even if you do have to wear a winter suit and raincoat most of the time. But then, who would cavil at a little cold and rain in a country where you can drive all day for weeks without seeing a three decker or a billboard, and feast your eyes on green fields and thatched roof cottages, old manor houses and proud cathedrals, with never a blot of any kind to mar the wholly entrancing landscape.

"And when the day's jaunt is over, who could not find joy and romance in putting up at The Dun Cow, The King's Arms, The Queen's Head, The Craven Heifer, The Green Man, The Two Jolly Butchers, Adam and Eve, The Shoulder of Mutton, The Live and Let Live, The Three Cups, The Wagon and Horses, The Golden Lion, Fox and Hounds, The Three Fyshes, The White Hart, The Wait for the Wagon, The Quiet Woman, The Fighting Cocks, The Rising Sun, The Old Gray Mare, The Crooked Billet, The Friend at Hand, The Naked Man, The Four Horseshoes, The New Fiddle, The Pied Bull, The Coat and Boot, Old Lord Raglan, The Plough and Harrow, The Sow and Pigs, The Old Bay Horse, The Jolly Wagoner, The Three Magpies, The Golden Fleece, or a hundred others with equally enticing names. And who would mind eating endless ham and eggs, vegetable marrow, Yorkshire pudding and black currant tart, amid such surroundings?

1888 *Continued*

"I used to wonder whether all the old English inns, whose glamour had always held me, had all been torn down or spoiled over for countless American tourists in Charabancs, but I can assure you that nothing is farther from the truth. The whole delightful English countryside, from Northumberland to Kent and Lands End to the Scottish Border, is dotted with quaint and altogether charming old English inns, that look as if to them 200 years were but as yesterday. Yes, there are worse things than a summer in England."

Miss Catharine Bird Runkle, eldest daughter of Mr. and Mrs. John C. Runkle of 43 Kirkland Street, Cambridge, Mass., was married at home on Saturday afternoon, November 1, to Rev. Robert C. Withington, graduate of Meadville Theological School, Chicago, and Assistant Minister of Union Liberal Church, Pasadena, Calif. The couple will be at home after December 1 at 551 Pasadena Avenue, Pasadena, Calif.

Your Secretary owes an apology to Walter Shaw for telling only a small part of his yachting prowess in the October news. His *Andiamo*, 50 feet on the water line and sailing in the "M" class, also won the King's Cup, the most noted cup of the year in Long Island waters. Besides this, *Andiamo* won two firsts in both the Eastern and New York Yacht Club Cruises this summer. Walter also sailed in the week-end races at Marblehead his Bar Harbor 31-footers *Indian* and *Astrild*, the latter being handled by his son Walter K., Jr. All three of these boats have the distinction of being the only boats in the country that are equipped with hollow stream line masts with hollow walls of cellular construction, the latter idea being an innovation of Walter's which has proved very valuable and very practicable. The side walls of the *Andiamo*'s 106-foot mast are but 13/32 of an inch thick and are double, making a total of 13/16 of an inch of wood on each side of the mast. This mast is 13½ inches through with a round front of that diameter, 24 inches deep from front to back and it is the strongest mast in the "M" fleet in spite of the thinness of the walls. Walter recently made a tour of Canada in his new 16-cylinder Cadillac and says it is the best and smoothest running car he ever owned and he has owned and operated nearly every make of car since his first Stanley Steamer in 1906.

Harry Horn has recently become a two-time grandfather. This time his daughter is the proud mother of Barbara Stevens, now two months old and a pronounced blond. His grandson, H. J. Horn, 3rd, is the son of H. J. Horn, Jr., President of the Class of '22 at Technology. — Edward Collins, who has been in the Patent Office, Washington, ever since we graduated, writes: "I am glad that so many of our Class are still living. But most of us were healthy fellows, and not at all like the physical wrecks from over-study that Technology students were sometimes said to be. For myself, my eyes are not as good as they once were, but I am entirely free from gout, asthma,

rheumatism and such things which generally plague elderly men." Edward is looking forward to our grand Fiftieth Reunion in 1938, and is planning to attend. — Jimmie Baldwin, having won all the honors at Chestnut Hill Golf Club (President and Treasurer for a long term of years), has recently taken up miniature golf and bids fair to become a champion at this newest of all sports. — Alfred Sawyer recently spent a week in the delightful part of Maine around Farmington, motorizing there and back with a friend. His large summer house at Plymouth, Mass., was entirely destroyed by fire on August 24. — William B. Snow, son of our lamented Secretary, was married in August.

Your Secretary finds from the Class records that there are now exactly 100 men, formerly connected with the Class at the Institute who receive mail at known addresses. Of these 48 live in Massachusetts, 9 in Illinois, 7 in New York, 4 each in Pennsylvania, Ohio and New Jersey, 3 in New Hampshire, and 2 each in Connecticut, Minnesota, Alabama, and D. C., the remainder making up a total living in 24 states and 3 foreign countries, Cuba, Porto Rico, and Switzerland. — BERTRAND R. T. COLLINS, *Secretary*, 18 Athelstane Road, Newton Center, Mass.

1890

A card was received from deLancey from Paris in September, saying that he with Mrs. de Lancey have been motoring through Normandy, and were then going to Oberammergau. — Elton D. Walker with Glen A. Lindsey and Phillip M. Jones, have collaborated in publishing the Pennsylvania State College Bulletin in Studies at the Sewage Treatment Plant of the college. It is a pamphlet of some 50 pages and shows very interesting work. It is Bulletin 36 of the Engineers Experiment Station Series. — We note that President Hoover has recently called on industrial men for advice, among them was Charles Hayden, for a discussion on matters in the industrial and financial world. — Guy C. Emerson's business address is now 24 School Street, Boston, Mass. — Rev. Willard H. Roots' present address is 140 Central Street, Mansfield, Mass.

A picture recently appeared in the press showing that Charlie Hayden is apparently a riveter, and possibly must belong to the union. The picture shows Charlie driving a rivet in the construction of the new Waldorf-Astoria Hotel in New York. This is about the hardest work we have known of Charlie doing in the physical line for some time. — The following appeared in a Boston paper some time ago: "Professor Ripley of Harvard who, ten years ago, prepared a tentative railroad merger plan for the Interstate Commerce Commission, has made changes in his viewpoint, according to an article in the current number of the *World's Work*. When Congress passed the law in 1920 calling for a consolidation of all of the railroads of the country into some 20 systems, the fundamental plan approved by Ripley was to save the weak roads. Today,

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Ripley says, the main purpose of consolidations is to save the big roads from competition by automobile and truck, waterways, pipe lines for gas and oil, electrical superpower systems, all of which are cutting down the freight formerly hauled by the railroads." — GEORGE A. GILMORE, *Secretary*, 57 Hancock Street, Lexington, Mass.

1894

The Reunion, with its many and interesting events brought too little opportunity for the Class to get together as a unit for social purposes or for one of those remarkable golf tournaments which have been a feature of our five year gatherings. We did have, however, a Class Dinner at the Kenmore at which about 25, including guests, spent a most enjoyable evening. The guests of the occasion were especially the wives and daughters of members, but particular mention should be made here of one husband also, for Mrs. deLancey (Harriet Gallop) was accompanied by Mr. Darragh deLancey '90. Others attending were President H. A. Crary, N. S. Bean and guest, W. H. Bovey, C. A. Hawes, J. W. Phelan, G. A. Taber, H. E. Warren and Mrs. Warren, W. V. Batson, R. S. Weston and Mrs. Weston, J. W. Chapman and daughter, H. O. Lacount, A. B. Tenney and Mrs. Tenney, G. Owen and Mrs. Owen, and the Secretary and Mrs. Prescott. This was the first dinner ever held by the Class at which the families of members were present, and judging by the many expressions of satisfaction, it will not be the last. It was an occasion to be remembered. There was good talk, a very interesting exchange of personal histories and happenings, and a brief account of some of the important things done in science, industry and invention by members present and absent which have made '94 an outstanding class. It was evident that the wives (and husband) were really impressed with the quality of '94.

Letters expressing regret and sending cordial greetings were received from the following men: H. S. Duckworth, N. B. Day, W. H. Pratt, F. W. Lovejoy, L. Tufts, H. N. Parker, George Taylor, G. W. Sherman, R. W. Gilkey, and J. E. Thropp. Tom Curtis and Frank Lovejoy expected to attend, but were unable to make it. We shall hope to see them all and many more in 1934 at our next five-year gathering and our Fortieth Reunion.

The new year at Technology is again in full swing. The list of full professors on the Faculty now has the following '94 names: H. W. Gardner, G. B. Haven, G. Owen, J. W. Phelan, and S. C. Prescott. The student body contains sons of Gardner, Kimberly, Lovejoy, Phelan, and Prescott (two) and possibly others of the '94 group. A student from Cincinnati is here on the Richard Warren Proctor '94 Scholarship supported by the local Technology Club.

Recent addresses received are those of P. H. Coolidge, Wells Fargo Bank and Union Trust Company, San Francisco; J. C. Nowell, 1225 LaCuesta Street, San Mateo, Calif.; S. A. Savage, Box 205,

1894 Continued

Arbuckle, Calif.; T. G. Richards, 145 Fourth Street, Pelham, N. Y.—E. S. Jenckes has recently returned from a tour around the globe. —W. H. Pratt spent the summer in Europe, and a letter from Mrs. de Lancey, under date of October 5, describes a most enjoyable motor trip with Mr. de Lancey and their two daughters, through the Bavarian Highlands, attendance at the Passion Play at Oberammergau, and the prospect of more motoring in France. —SAMUEL C. PRESCOTT, *Secretary*, Room 10-405, M. I. T., Cambridge, Mass.

1895

The New York contingent of our Class are contemplating a mid-winter reunion at New York City sometime during the month of January, 1931. This feature of local reunions we find to be an excellent and enjoyable occasion and we think other localities would find it valuable. The Boston contingent have tried it several times in past years and now plan to establish such meetings as regular events.

Frederick A. Hannah has recently returned from a six months' stay in Russia where he was in the service of the Russian government. We look forward to Fred's letter of his experiences as soon as he is able to give it to us for publication.

We are glad to note the awards of the prizes by the American Society of Civil Engineers at the fall meeting held in St. Louis during October, and especially the prizes given John H. Gregory. We quote as follows: "The James Laurie Prize of the American Society of Civil Engineers for the year 1930 has just been awarded to John H. Gregory, C. B. Hoover, and C. B. Cornell, members of the Society, for their paper entitled "The O'Shaughnessy Dam and Reservoir." Mr. Gregory is a member of the faculty of the Engineering School of the Johns Hopkins University and is serving the Public Improvement Commission of the city of Baltimore as consulting engineer on the design and construction of the Prettyboy Dam; Mr. Hoover is superintendent of the Water Works of Columbus, Ohio; and Mr. Cornell is the engineer recently employed by the Public Improvement Commission of Baltimore to take charge of the construction of the Prettyboy Dam.

Each year the American Society of Civil Engineers, the oldest national society of engineers in the United States, awards two prizes for the two best papers printed in the transactions of the society for the year immediately preceding, and describing in detail completed works of construction and their cost. The prizes are known as The Thomas Fitch Rowland Prize and The James Laurie Prize. The first of these was endowed in 1882 by the late Thomas Fitch Rowland, a well-known civil engineer and honorary member of the Society. The second prize was established by the Society in 1912 in honor of the late James Laurie, first President of the Society, holding that office for fifteen years (1852-1867). Each prize consists of an honorarium and an engraved certificate. The prizes are presented at the annual meeting in New York.

"With the award of The James Laurie Prize, Mr. Gregory will have received both prizes, as he was awarded the Thomas Fitch Rowland Prize in 1910 for his paper entitled "The Improved Water and Sewage Works of Columbus, Ohio," and it is of interest to note that in this paper, among other things, Mr. Gregory describes the design and construction of the Julian Griggs Dam at Columbus, the first of the two dams built by the city. Furthermore, both papers deal with completed works of construction for the city of Columbus.

"The O'Shaughnessy Dam was designed and built by the Bureau of Water Works Extension of Columbus, and was completed in 1925. It is a massive structure built across the Scioto River in Central Ohio, about 17 miles north of the city of Columbus, constructed so as to provide the city with a second large water supply reservoir. The total length is 1,750 feet, including the approaches, and the masonry or spillway portion of the dam over which the water flows is 879 feet in length. Crossing the dam over the spillway section is a reinforced concrete arch bridge of 12 spans. The bridge has a roadway of sufficient width for two lanes of motor vehicles and on each side of the roadway is a sidewalk for pedestrians. The crest of the spillway is 64 feet above low water in the river, and the total height of the dam from the rock foundation to the roadway level is 105 feet.

"The Prettyboy Dam will be somewhat similar in construction to the O'Shaughnessy Dam. It will be built entirely of masonry and will have a spillway section carrying a reinforced concrete arch bridge with roadway and sidewalks. It will be considerably higher than the older dam but of less length. It is expected to be completed in the fall of 1932." —LUTHER K. YODER, *Secretary*, Chandler Machine Co., Ayer, Mass.

1896

All the ammunition available in the way of news was utilized for the last issue, and the accumulation of new material has not been very great. However, the Secretaries are in a mood for proposing three rousing cheers over the passing of a whole month without the report of sudden death in our ranks. It looks as if this epidemic might have run its course, and that classmates can be assured of further years of existence. If we had continued at the same death rate as during the past year and a half our ranks at the celebration of our Fortieth Anniversary would have been very thin. There would probably have been at least one survivor to go to the Class Dinner and act as "Last Man" to drink the theoretical bottle of wine which should have been prepared at the time of our graduation, had we foreseen the enactment of the Volstead law. Perhaps classmates were wise, and had some gift of foresight, when they drank that bottle while the drinking was good.

As newly elected term member of the Corporation, Dr. Coolidge made his maiden appearance at the annual meeting

of the Corporation in October, and was duly initiated. The Secretary was fortunately able to catch him for a little chat, and among other subjects discussed was that of how he was able to carry on at high tension mentally and maintain a big output of ideas and new developments. His receipt seemed so good that the Secretary is passing it along for the benefit of others. It is contrary to the Edison idea. Coolidge believes that his continued activity depends largely upon ample and regular hours of rest, involving eight or more hours of undisturbed sleep every night, and also relaxation from his technical problems during the hours that he is away from the laboratory. He believes that a man's hobby also should not be one which taxes his brain to the same extent, or even a greater rate than your regular work, although it may be along an entirely different line. The hobby should be one which leads to relaxation and rest, but at the same time gives a man something to keep his mind profitably occupied when he is away from his work, and also to keep him from thinking of his work. This all sounds like good dope, just as Coolidge's ideas always are.

Dr. G. B. Waterhouse of the Technology staff attended a technical meeting at Lehigh University in October, and on his return reported that he had seen considerable of Bradley Stoughton, and that Bradley had left for Europe with Mrs. Stoughton early in August and returned October 6, traveling on the Red Star Line both ways. The trip was largely for pleasure, although partly on business. He attended the meeting of the Iron and Steel Institute at Prague, in Czechoslovakia, September 15 to 20, and also took in the Passion Play at Oberammergau. At the time of Dr. Waterhouse's meeting Stoughton was very busy preparing for the dedication of a new laboratory building at Lehigh the following week.

A card from Myron L. Fuller, postmarked Stockholm, reported that in August he and Mrs. Fuller had just finished a trip of 700 miles by steamer through the lakes and rivers of Finland. This included the shooting of a 50-mile strip of rapids, and also brought them within 25 miles of the Arctic Circle. From Stockholm their trip was to continue to the ruins of Visby on Gotland, thence crossing Sweden by the Guta Canal and lakes and through Denmark and Holland to end at Oberammergau in Germany on August 31. Fuller's travel trips are so interesting to classmates that the Secretaries hope to secure a little more detailed account of this trip for a later issue.

On October 18, Con Young and Mrs. Young appeared with their smiling faces at the Secretary's office at Technology and reported that the new house down on the Cape had been completed and equipped, and that the latchstring was being kept well lubricated for all classmates who might be passing that way during the warmer months of the year. They closed up, however, about the first of October and made their annual pilgrimage to the Adirondacks, where Con

1896 *Continued*

tried unsuccessfully to lure that big bass that got away from him some years ago, and which is one of the big factors that maintains Con's keen interest in life. He will never die happy until that bass is captured. They were spending a day or two in Boston, and then were going south by easy stages, with stopovers around Washington, D. C., York, Pa., and elsewhere, so as to arrive at Fort Myers, Fla., their winter headquarters, before cold weather overtook them in the north. They were both wearing splendid coats of tan, indicating that the summer had agreed with them, and reported that they were feeling quite fit, with the exception that Con's rheumatism occasionally manifests itself, and this rheumatism has forced him to give up the pleasure of golf.

Inquiry has been made why Eugene Hultman has not been mentioned in these columns for a few months past. It seemed wise to have a period of watchful waiting, to make sure whether Gene was going to sink or swim in his new job of Police Commissioner for the City of Boston. It now appears that he is going to handle this situation just as successfully as he has handled other difficult situations which have prevailed on previous jobs held by him. The newspapers and the Legion authorities were loud in their praise of the efficient way that the Legion parade of 50,000 men, and crowd of spectators estimated to be as high as two and a half million people, were smoothly handled by the Police Department on October 7. It is an old adage that everything has an exception, and therefore in this case there was a discordant note. The papers report that Mrs. Peabody publicly criticised the Police Commissioner for his failure to control the liquor situation during the week of the Legion convention in Boston. The situation was apparently that someone else was able to purchase a bottle by some underhand method. These two bottles were consumed and resulted in some conviviality, and of course Gene was made the goat. It is not believed, however, that he is losing any sleep as a result of this criticism. The Secretary knows for a fact that he is keeping busy all the time, but at the same time he is getting matters well in hand and is also finding the work extremely interesting.

Newspaper headlines in Boston papers announced that Professor Leonard Perley Dickinson, with Mrs. Dickinson, weekended in Boston during the early part of October, making their headquarters at the Hotel Somerset, but they apparently very carefully avoided the Technology buildings, as the Secretary neither saw nor heard anything of them directly. — CHARLES E. LOCKE, *Secretary, Room 8-109, M. I. T., Cambridge, Mass.* JOHN A. ROCKWELL, *Assistant Secretary, 24 Garden Street, Cambridge, Mass.*

1898

A young lady staying in Geneva last summer taking some of the international courses given there, attended one course on the study of the world's races given in English by a German professor. Of

interest to us is that the professor began the opening lecture by quoting from an American book entitled "The Racial Prospect" by one Seth K. Humphrey. Seth gave an amusing and interesting talk recently on his summer in England before the Technology Faculty Club at their Fall Banquet.

Ben Hinckley spent last winter in Southern California. Some friends, Parker brothers, running a date ranch in the Coachella valley near the Salton Sea invited him to motor down for a visit. He found another one-third owner, Edwin E. Wightman, Course I, '98. Wightman's last address on our files is Pennsylvania Steel Company, Steelton, Pa., in 1923. Since then we have had no address until the present one of Coachella, Calif. Ben describes the climate in the valley some hundreds of feet below sea level as delightful in winter. It is infernally hot in summer. Wightman seemed to be enjoying life there. Date growing in a green oasis in the midst of an arid desert sounds fascinating in many ways particularly when the Southern Pacific R. R. runs through and will take one in a few hours to the cool shores of the Pacific.

Dr. S. Fosdick Jones has been a very prominent and very busy man in his profession of surgery in Denver, Colo. Feeling his health failing, he has given up his surgical practice in Denver and resigned his professorship of orthopedic surgery at the University of Colorado. He remains emeritus professor at the University. He is giving up his residence in Denver and going to Pasadena in December where his residence will be 710 South Orange Grove Avenue. His mail address will be California Club, 5th and Grand Streets, Los Angeles. He swells the number who have retired to the Pasadena-Los Angeles region of Southern California to enjoy a well earned leisure (or perhaps activity at that), Paul Johnson, Homer Sargent, and Everett Curtis. Others who have gone to California that we think of are: Wightman (as mentioned above), Bill Perley, and Frank Coombs. These men are in active business, however. We just heard that Frank Coombs has set up in business for himself. Norman Watkins of Honolulu and California has just been around the world and passed through New England recently on his way back to the west.

Hollis Godfrey has been very sick for about a year and a half from complications arising from an accident. He is, we are glad to say, getting better. We ran into him down in Marshfield recently; he was driving his auto but there were two pairs of crutches in the back seat. Both he and Mrs. Godfrey still need crutches to walk. A little later we drove over to Godfrey's summer place at Duxbury. He has a cottage setting on a high bank and about two acres of the most beautifully landscaped gardens and orchards imaginable.

We have seen several mentions of Percival Lombard in connection with his historical work for the Massachusetts Tercentenary. — The following note of

interest to the Class was received from one whose name is included (your first guess probably will not hit it): "You might make a note for The Review that the following members of the Class have their biographies in Who's Who in America for 1930-1931. It may be a record for any class. Perhaps you can find others that did not occur to me. Babson, Blanchard, Gardner, Godfrey, Humphrey, Peavey, Tallmadge, Treat, and Winslow." He left out at least the following: Milan V. Ayres, Economist; Frederick L. Bishop, Dean of the University of Pittsburgh; George W. Craven, mining and electrical engineer, formerly President of the Montana School of Mines; Raymond M. Hughes, President of Iowa State College; Samuel Fosdick Jones, surgeon; Gorham P. Stevens, architect, director of the American Academy at Rome; and William Lyman Underwood, naturalist.

Lewis Seidensticker's daughter, Katherine, is a freshman at Technology, studying biology after spending one year at Wellesley. — ARTHUR A. BLANCHARD, *Secretary, Room 4-160, M. I. T., Cambridge, Mass.*

1899

In the October issue I promised that we would have more news from our traveling members such as Emery, Rood, and others. Emery wrote tantalizingly of "a summer replete with interest" on a trip that took him to Zagreb, Belgrade, Bucharest, Sofia, and Constantinople. Not a detail did he give me concerning adventures and experiences which must perchance befall the traveler in the Balkans. Constantinople and the Golden Horn, pirates on the Bosphorus, Sofia, Belgrade and Bucharest are all names to conjure with, but all Emery did was mention them, and he failed to send a map! We may hear from Lew later.

Rood sailed for Paris in May (see previous notes) to recover from an automobile accident, but Paris did not prove a satisfactory health resort, though it was an excellent shopping center for his family. When the shopping was finished Rood went up to Berlin which proved no more of a health resort than Paris, so he went on by plane to Moscow — still searching for health I take it as he had not reported it found. After a few days in Moscow he went on to Leningrad, Nizhni Novgorod and on up the Volga River. He spent a month in Russia and tells me that like all travelers who have spent a month in any foreign country, he knows all about it. Unfortunately he didn't tell me all he knew.

After his restful Russian journey, Rood went on to Warsaw, Poland, and there bought a collection of Polish posters to supplement his collection of French and German War posters, and the Soviet posters he had gotten in Russia. Norman, you will all recall, used to make posters at Technology. Now he buys them. In that he has only followed the trend of the times — our grandmothers made their own dresses, but our wives buy theirs. And how! From Warsaw back to

1899 *Continued*

Berlin he traveled, thence to Rotterdam and to London where he bought a dog, a false mustache and a ticket on the *Berengaria*. He arrived in New York wearing the mustache, a pair of dark glasses, and a suit of borrowed clothes. Such was the transformation that his wife and daughter did not know him—and there are people who say that clothes do not make the man! It is to be hoped that Norman goes again and writes as entertainingly of his travels.

Alex Holliday stopped in Washington recently, the first '99 man to appear this season. We had luncheon and settled the affairs of the world after which we got down to everyday things like golf and country clubs, and checked up on whom we had or had not seen recently, meaning, of course, Technology men. Alex is going to Europe shortly and is planning to look up Stebbins at the Closerie des Saules at Tessancourt, an establishment unique of its kind and one to which homesick Americans go to get chicken and sweet corn roasted on the ear in the open air. He hopes to find Stebbins, but it has been rumored that the wanderlust has led Stebbins elsewhere. But whatever he finds, he is going to let us know about it. Alex's avocation is Egyptology and he makes a good job of it.

Somebody told me that Miles Sherrill spent the summer in California collaborating with Dr. Noyes on his chemistry book. Someone asked Miles at the All-Technology Reunion if he would have the book finished in the next 15 years. He has been working on it since 1899, and the Class should give him a medal when he finishes it. — Remember, also, that we are planning a Reunion the first week in June, and keep the date open. — W. MALCOLM CORSE, *Secretary*, 810 Eighteenth Street, Washington, D. C. — ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston, Mass.

1900

At the time of the Reunion we sent Collier a wire to urge him to attend but he writes that he was tied up in a big deal with the Commonwealth and Southern properties in Georgia, Alabama, Mississippi, and Tennessee which held him in the South. He sends in a cordial invitation to all the boys when in or near Atlanta to look him up. His name is in the local telephone book.

E. H. Davis, IX, writes in to say that he has just returned from a trip to Europe this summer and sends his best to all the boys. — Cady, VI, writes that he had a fine time on his recent trip to Europe. He wants to be remembered to all his old friends and sends along word that he has played several games of golf with our old friend Jouett lately. — The scribe just had a telephone conversation with J. B. Conant who is getting along finely. He is nearly recovered from his recent illness and puts in some time daily at his office, all of which is good news to his host of friends.

Clarence Brown, VI, writes in to say that he was sorry not to be at the Thirtieth Reunion but fully intends to take in

the Fortieth and Fiftieth. May we all be there! His business address is Philadelphia, not Germantown as given in the Thirty Year Book. — Dart, III, writes that he expects to come East for the next reunion, even if he has to walk. One thing we can remember is he never walked when on the bases, however, he admits that his baseball arm is no good any more. — Grant, XIII, wrote in expressing his appreciation to the fellows who are carrying on for the Class. He fully intended to see us at the Reunion but his European trip interfered. — Wilbur Davis, I, is a busy fellow these days. He has charge of the Subway Extension at Governor Square and 14 hours a day is the usual thing. The work is progressing favorably. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

It is the sad duty of your Secretary to record the death of two members of the Class since my last communication. From Charlie Auer I have received a group of clippings relative to the death of Jules H. Hirt who died of apoplexy on September 14. For many years past Hirt has been active in his profession as mining engineer and metallurgist, making his headquarters in El Paso. He was returning from a business trip to Presidio and ten miles east of Van Horn stopped his car to look at the tires. The hemorrhage occurred and he fell dead beside the car. Hirt was a native of Belgium and came to this country at the age of 14, settling in New York where his earlier education was received. Since 1909 his headquarters have been in El Paso. In 1903 he married Miss Harriet Mary Stone of Boston and is survived by his widow, two daughters, and several members of his own family. Auer was one of the pall bearers at the funeral. From an appreciation of him in one of the El Paso papers, I quote the following:

"Soon after graduating in the Class of 1901 from M. I. T. his inventive mind created several new technical ideas which brought him recognition as well as ample financial reward. . . . His seriousness at all times commanded respect and yet such was his character that his friends loved him and his acquaintances respected him. In his death the technical world has lost a real worker and El Paso a man worth while."

In a clipping which I owe to the courtesy of O. B. Denison, the following sad intelligence of Fred Webster was given: "Fred B. Webster, naval architect and marine engineer, is dead in New York at the age of 52. He served for many years in the Navy Department at Washington and at Seattle. Mr. Webster was a graduate of the Massachusetts Institute of Technology. He had been editor of the *Shipbuilding Encyclopedia* and of the *Marine Engineering and Shipping Age*. Later he became President of the Marine Journal Company, and still later he was associated with the Marine Age and the New Jersey Asbestos Company. He had been a member of the Shipping Board Fuel Con-

servation Committee, Maritime Exchange and the Propeller Club of the United States, Port of New York. He was the first speaker to address the club when it was founded."

Speaking of Charlie Auer, who by the way wrote the appreciation of Hirt from which I quoted above, he is one of the solid citizens of El Paso and I hope a qualified guide to the various centers of recreation across the frontier. I am planning to make a trip to that part of the world before long and am counting heavily on Charlie's anthropologic knowledge. As a mining engineer he must have a great deal of valuable information about gold digging which I understand is the principal industry of our Mexican neighbors near the border.

And from William S. Pepperell a statement that brings a blush to my cheek when I think of the shabby way in which I have treated him in the past. For Bill has emerged from the obscurity of his letter boxes and can now be found at 125 Congdon Street, Providence, R. I., Averill, Vt., and at The Shenandoah, 10 Sheridan Square, New York City. Bill is president, vice-president or treasurer of a large number of corporations in Massachusetts, New York, and Rhode Island, dealing in cotton textile manufacturing. There are three junior members of the family; I refrain from calling them little as they might drop into my office some day to convince me of my error. The most important part of William's statement, however, is peroration in which he states that he plans to attend the Thirtieth Reunion. These be good news.

Blanchard is at 101 Park Avenue, New York City, pursuing his vocation of architecture. For the rest he writes "nothing new" from which I assume him to be a student of the utterances of our vocal optimist in Washington. — Howard Wood, still with the incandescent lamp department of the General Electric, writes that he and Mrs. Wood visited Alaska this summer, seeing only that part which harbors tourists. He adds that he still sees totem poles in his sleep. I am at a loss to know whether this be a mythological reference to the God of the fields or whether it spells hang-over. I visited Alaska in 1919, though I did get away for a time from the tourist trail, and the liquor was certainly bad then. From local experience in the intervening years I see no reason to assume that it has improved in quality.

I saw Louis Williams in Detroit last spring and spent a thoroughly enjoyable afternoon with himself and his family. Louis, like Matt, has left D'luth and is now running the C. N. Ray Corporation and its affiliated companies. Louis says that this job embraces everything from supervising gravel plants to supervising a 1200-acre farm. Enthralling as the terminal occupations may be, I am much more interested in the details of the intermediate embraces about which he is discreetly silent. Louis suggests that I come back to Detroit, and I am going to. This thing intrigues me with its suggestion of healthy, happy outdoor life.

1901 Continued

Leaving gossip for the moment, there are two matters that I should like to place before you.

First, there are a large number of the Class who have failed to reply to my letter of last summer. True delicacy leads me to emphasize my need for "interesting news regarding yourself or any other '01 man." Take the trusty fountain pen or the more congenial though less reliable office adjunct and pen — this an obsolete term — and write me a few words, a signature or two, and news items.

Second, the Class of '01 holds its Thirtieth Reunion in June of the coming year. A committee from what is usually referred to as the members of the "Boston Gang" are to meet in the immediate future to consider ways and means. In view of the present unfortunate trend of politics all matters relating to the rights and duties of an embattled citizenry will be rigorously excluded from the discussion and we shall deal only with the time, the place, and the other loved ones together. The results of our cogitations will be broadcasted by a paternal government at the expense of two cents per capita and the significant details placed before you to invite your interest, cooperation, and most importantly, participation. The local committee will endeavor to make plans which will conform with the needs, suppressed desires, and prejudices of all. This may seem like a large order but I believe it can be filled. Anyhow come on and try it out and if the party is not all you personally could wish you can always indulge in that most pleasing of pastimes, finding fault with the committee. Think of the intrinsic happiness of embittering my life with acid comment on the inadequacy of the entertainment offered. I hold this out as a special inducement to certain members of the Class who will identify themselves as they read these lines. For the moment there isn't any more. — ALLAN W. ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

1902

Classmates will learn with deep regret of the death on October 6 of Ralph Emery Thurston. The news will come as a real shock to those classmates who saw him at the All-Technology Reunion in Boston last June, for at that time he seemed as well and full of energy as ever. Late in August Thurston went to the Truesdell Hospital in Fall River for treatment of an infected tooth. This had been allowed to go too long and his system had become poisoned. As often happens in such cases, complications followed and he contracted pneumonia. His resistance had been so lowered by his previous illness that he fell a prey to this disease after several weeks of severe suffering.

Thurston was born in Fall River where his family has long been prominent, on August 6, 1877. He prepared for Technology at Worcester Academy. After graduating in Course VI, he located in Chicago with the Commonwealth Edison Company and later he was for a year with the Narragansett Electric Light Company

in Providence as solicitor for power business. In 1906 he took a position in Putnam, Conn., with the Light and Power Company of that city, advancing in a few years to the position of manager. When the Putnam Company was absorbed by the Connecticut Electric Light Company, Thurston became division manager at Putnam.

In addition to his work in the Light Company he served his adopted town as Commissioner of Public Works and for many years as Chief of the Fire Department. His many public activities and his hearty personality made him one of the most prominent citizens of Putnam. At the time of his funeral all activities in the town were halted and the public buildings were draped in mourning. Thurston was a member of the Elks and various Masonic bodies, also of the Connecticut Chamber of Commerce, New England Association of Fire Chiefs, the Putnam Country Club and the University Club of Boston. He had never married, and is survived by a sister, Mrs. Cora B. Terry of Fall River.

Les Millar, our Class President, has recently accepted a position as sales manager for the Milwaukee Valve Company. For the present Les' mailing address remains at his home, 510 Washington Avenue, Wilmette, Ill. — John M. Fitzgerald has been chosen as Vice-President of the Class, for Chicago, to fill the vacancy caused by Dana Fisher's removal to Philadelphia. Fitzgerald is President of the Aldobilt Company, 111 West Jackson Boulevard, Chicago. — FREDERICK H. HUNTER, *Secretary*, Box 11, West Roxbury, Mass. BURTON G. PHILBRICK, *Assistant Secretary*, 246 Stuart Street, Boston, Mass.

1905

"After my effusion on the Spanish trip last year, you are indeed bold to ask for one on Peru. I will, however, try to spare you many of the sad details," wrote Dick Senger last May.

"I left Salt Lake about the middle of January in a howling blizzard. By the time I got to New York, by way of Tennessee, I passed through all kinds of weather zones. In New York galoshes, and even heavy socks, were unnecessary. The dear old Atlantic whipped up a beautiful storm, so that two-thirds of the passengers were seasick the first night out. After two days the ocean was as calm as Jamaica Pond, and a damn sight warmer.

"I will not bore you with the details of the trip southward. It was most enjoyable, with salt water swimming on deck, beginning off the coast of South Carolina, and lasting throughout the trip. The canal did not disappoint me, as it does so many, and the Pacific had a right to its name. Many a time, however, I would have exchanged the deck swim for a good cold Utah breeze, as I could not get off enough clothes to be comfortable, either bathing or sitting around. I envied the little nigger boys who run around stripped in the back streets of Panama.

THE TECHNOLOGY REVIEW

"I got off the boat at Salaverry, Peru, ten days after sailing from New York. Salaverry is the port of entry of Trujillo, six miles up the coast. Trujillo is, I believe, about eight degrees south of the Equator, and the second largest city in Peru. It is at the mouth of the Mochi Valley, where 80 miles inland and 12,000 to 13,000 feet up in the air my firm has a group of mines, mills, and a smelter. I stayed up in the air most of the time while in Peru. On the trip from Trujillo up to Quiruvilca, the last and highest mine, one goes in a few hours from tropical heat to a north temperate atmosphere, so rarified, however, that it does not feel the same. On the coast are big sugar plantations, banana groves, and fields of tropical fruits and vegetables; up on top even trees won't grow. Around 8,000 to 10,000 feet above sea level there are hundreds of chacres, or Indian cultivated acres, from which the Indians have scratched a scanty living for possibly three thousand years. Some of these chacres seem to stand on end, and how any self-respecting plant can take root and hang on is hard to imagine.

"Peru, like all the so-called Spanish-American countries, I found to be very interesting. The people of Spanish blood, according to our standards, are the best. The Indians to me, however, are the most interesting. Along the coast the Indian is sadly mixed with negro and oriental blood. If they have any white blood in them, it does not show. The mixture is not an improvement over the various ingredients entering into it. Toward the interior the Indians are superior, and it is not hard to imagine how under Indian leadership they at one time developed a high state of civilization.

"A few miles out of Trujillo are the remains of a pre-Inca civilization. The place is now called Chan-Chan, and was the former capitol of the Chimu race. Some of the adobe brick walls which formerly surrounded a large city are standing. Irrigation ditches miles in extent can be traced outside of this ancient city. It is estimated that the city at one time had a population of a quarter of a million people. They were conquered by the Incas, according to legend, several hundred years before the Spanish conquest. It is a matter of official record that the Spaniards dug up more than five million dollars worth of gold and silver ornaments and vessels out of Chan-Chan. (It is hard to imagine that gold and silver were looked upon by the ancient Peruvian Indians as useful metals, and valued as such along with copper, and were not used as mediums of exchange.) These things are still occasionally dug up, along with pottery, robes and tapestries, some of which are of marvelous beauty. If you do not believe it, drop into the Natural Museum of History in New York some time, and look at the Peruvian collection. It will open your eyes as to what these tropical Indians accomplished centuries before the white man's invasion. In Peru, a few centuries before the Spanish conquest, the Inca was simply a vigorous upstart race, raring to go. He fought,

1905 Continued

conquered, dominated, or absorbed all his weaker neighbors, and he was constantly extending his neighborhood.

"I have been told by authorities that in the ruins of Chan-Chan one can decipher the history of a race. It is estimated that the city had been occupied at least 2,000 years. Archeologists can trace back the history of a race which had grown up from semi-nomadic and primitive basket makers, hunters and fishers, through the pottery age, to a metal working and agricultural civilization, and finally to a stage of over-civilization and softness when they were easily conquered by savages.

"Before returning northward I flew the 300 miles from Trujillo to Lima, over the most desert region I have ever seen, not excluding Death Valley. There are many ruins of pre-Columbian Indian cities, settlements and fortifications which one sees on this trip.

"My work in Peru kept me there a month. I had leisure enough, however, to take in a few side trips. I hope to go back again some day, not on business or a tour, but as a real traveler, and penetrate into the interior along the west coast the whole length of South America. Some of the yarns I heard, together with the things I saw, aroused my traveler's curiosity to see more.

"Now aren't you sorry you got me started?"

Clarke Warren has explained the reference to Bill Green, the bailiff, and "Singing in the Bath Tub" in the November notes. This bit of undergraduate history should be recorded. Clarke says, "During the 1905-1906 rush in the spring of 1902 a woman selling flowers from a stand on the sidewalk across from Rogers was 'severely injured' by the mob, students or others I never found out. Among others Bill Green and I were accused of assault and warrants issued for our arrest. Bill and I were living at Tech Chambers and some other victim who was 'served' warned Bill and he retreated to the bath room and climbed into the tub, covering himself as well as he could with towels. The bailiff found him trying to crawl down the drain and served him with the summons. Bill got to me before the bailiff and I never was served. Many times I walked past Mr. Bailiff, who was waiting for me at the dining room door, through the room and out the back door to eat with Bill at his boarding house. Never will I forget Bill's kindness and always find occasion to sing a song of gratitude when I find myself in a bath tub."

For the second successive year, the direct mail division, Charles Hawkes, Manager of the Sampson & Murdoch Company, won the silver trophy offered by the Direct Mail Advertising Association for the best advertising campaign of the year with letters a prominent part. The award was made at the national convention in Milwaukee. The winning campaign was prepared for the Working Men's Co-operative Bank of Boston. Charlie is New England representative on the managing committee of the National

Council of Business Mail Users and has been an official of every organization connected with direct mail advertising.

Harry Charlesworth was host to 100 executives and bankers on October 7 at a demonstration of an electron gun which shot millions of electrons into a half inch bucket to demonstrate they are actually particles of the atom and not waves as some scientists contend. We trust the executives and bankers were convinced.

George Jones' boy, who was last year at Antioch College, where the student spends one-half of his time in a factory, has transferred to Northwestern.—Oscar Merrill has returned from the World Power Conference at Berlin and has headquarters in New York, 1419 Chrysler Building.—Sam Shapira has again returned from Russia. He may be addressed care of Charles Guterman, 620 West 149 St., New York.—Ralph Whitcomb was still abroad the last of October and should have a good story to tell. We have no idea where he has been all this time.—Ed Burkhardt stopped off at Middletown in October to see his boy, a freshman at Wesleyan. We had a very pleasant evening together. Before long we were competing to see who could recall the greatest variety of amusing incidents of our Institute life. Things we had long since forgotten Burk described with vivid details. He won, hands down.

When a photograph of the S. S. *Europa* in dry dock was published last spring, we wrote Henry Keith for an explanation of the funny bow lines. Henry's reply may not be news but will interest the members of XIII. "Concerning the bulbous bow on the *Bremen* and *Europa*, it is really the first time it has been used on large passenger ships, but that is because practically none of this type of vessel has been built for a long time. We have used it in naval vessels ever since the days of the *South Carolina* and *Michigan*, and the *Lexington* and *Northampton* classes certainly have some big ones. There still seems to be some doubt as to whether it reduces resistance for a ship among waves, that is, whether it helps sea speed very much, but in smooth water it surely is a big help, say 2½%. — I saw Sid Caine at the Navy Yard during the war, but that is the last time, and I should think he might drop in and see us here in the Naval Architecture Department. It seems rather a good idea to have two presidents at the Institute for at the present time there seems to be work enough for three or four.

Some of those at the Twenty-Fifth Reunion have commented on the change that has come over us recently, the terrible tumble we have taken in sports. Once, and far back, we were proud of our prowess in baseball. There were signs of degeneration in '25, at Marion, when somebody brought an indoor bat and ball, but we thought it was only because we could find no class nearby to play. This year, however, the only violent form of exercise was golf. Nobody but Bob Lord would swim. It is very, very sad. — And that reminds us that we have had no report of '05 at Swampscott and the banquet. Your scribe did not go to either

and has been unable to locate anyone who did. He would be glad to get the story from some of those who attended.

Last winter Elmer Wiggins and his wife made a trip to Europe lasting two months and a half. Time was spent examining the castles and cathedrals of England, whence they moved on to France, Belgium, Holland, Germany, Austria, Switzerland and Italy. Elizabeth and Walter Raleigh in England and Napoleon in France received particular attention though the battlefields and Alpine scenery were enjoyed. Italy was the *ne plus ultra*, according to Wig, in spite of the fact that the duce was apparently unaware of his arrival. Of the trip, Elmer wrote the following:

"The question has often been asked me, what was the most interesting thing we saw in Europe. There are two things that stood out noticeably in my mind. One on the constructive side, and the other what I would call the depressive side. The progressive thing that interested me most was the Deutsches Museum in Munich, which took hundreds of years to build, and which is just being doubled in size now. Here you can see the complete development of every art imaginable, and almost every industry known to man, and it would be most instructive for anyone to spend a week or month in this building, as you can see models of everything that has been done by man, and in some cases the real thing. This is particularly true in farming machinery and in the description of boats; in the latter section you see first the Indian canoe, and then all modern water conveyances developed up to the modern steamship and modern war vessels. Models of some of the bigger vessels were shown; some 20 feet in length and showing the complete workings of the boats. The actual Submarine U-1 as used by the Germans in the war was in place with the sides cut away to show the inside workings, including the torpedoes. The guides take pride in telling you how many merchant vessels were brought down by this boat during the war. I do not think there is anything in the world like this Museum. . . .

"On the other side of the picture were what appeared to me as the very evident reasons for the people of Europe being kept down as they have been for centuries. First were the remains of the old castles, fortifications, and so on, which are reminders of the old feudal system which was responsible for keeping down the peasants and common people for thousands of years. Then you see the immense, elaborate and costly churches over all Europe, some of which have been centuries in building and not yet complete. There is no question in my mind but that so much money given to churches, and the attention paid to them, took away not only the initiative but the means from the people in developing and progressing in other material ways." — ROSWELL DAVIS, Secretary, Wesleyan Station, Middletown, Conn. — SIDNEY T. STRICKLAND, Assistant Secretary, 20 Newbury Street, Boston, Mass.

1906

M. W. Hayward, III, consulting engineer for the Penoles Company, who has made his headquarters at Monterey, Mexico, for a number of years, has now moved to the head offices of the company at 810 Mills Building, El Paso, Tex. — The following is taken from the *Southwestern Bulletin*, a magazine published by the Southwestern Engineering Corporation: "Edwin K. Chase is the advertising manager for Southwestern and a graduate of the Massachusetts Institute of Technology in '06. He was with the Omaha refinery and with the American Smelting and Refining Company as assayer for two years followed by two years mine examination work. He was again with the American Smelting and Refining Company at various plants in Colorado as assistant chemist, chief chemist, assistant superintendent, and in charge of the arsenic and rare metals plant at Denver in promoting new products from cadmium. After two years construction work in California, Mr. Chase came to Southwestern early in December 1925."

Ned Rowe has received a letter from Jack Norton advising that F. E. Dixon, V, died this summer at Cuyahoga Falls, Ohio. Dixon advised in 1916 that he had four years of analytical chemistry, six years of factory management, production engineering and efficiency work. At that time he was with the Widlar Company at Cleveland, Ohio, and was married and had two daughters. It is understood that at the time of his death he was still in business at Cleveland, but other details are lacking at this time.

Ned Rowe reports he had occasion to visit Hartford, Conn., some time ago and while there he ran into Malcolm Wight. Wight was special agent for the Hartford Fire Insurance Company at Boston, but a year or so ago was transferred to the home office. — Fred Batchelder, who is inductive coördination and protection engineer with the New England Telephone and Telegraph Company of Boston, took a five weeks' trip to Europe with Mrs. Batchelder this past summer. Fred visited England and France and reports a most enjoyable trip.

E. R. Hyde, I, who is professor at the University of Philippines, Manila, is enjoying a year's leave of absence, which he is spending in this country, and will return to the Philippines via Europe, thus encircling the globe. After landing on the Pacific coast, he crossed the continent by automobile and took up a temporary location at Brooklyn, Conn., the home of his father's family. He has been renewing old associations around Boston, and on November 13 sails to London from New York. Hyde is married and has a daughter. Incidentally, Hyde reports Paul Mack, I, who is associated with the water commission at the Philippines, has been married recently. The Secretary was particularly pleased to see Hyde as we were schoolmates in high school. In this connection another representative from Somerville High was H. D. Loring. Loring entered Technology with '06 but obtained

a year's leave of absence in his Institute course and therefore affiliates with '07. Hyde visited Loring on his way east and reports that Loring's son is a freshman at Technology. Loring is a member of the firm of Ferro Concrete Construction Company at Cincinnati, Ohio. (Bryant Nichols may copy this without enfringement.) — JAMES W. KIDDER, *Secretary*, 8 Harrison Avenue, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

1907

Robert Pevey Stevenson, associated with the Henry L. Scott Company of Providence, R. I., for the past five years, died at his home in East Providence, September 21, in his 46th year. Steve was born in Lowell, Mass., and educated in the public schools there. After graduation he entered Technology as a member of our Class, Course II. Prior to his association with the Scott Company, he was employed by the Lockwood Greene Company, American Steel and Wire Company, Charles T. Main, William V. Threlfall, Mt. Vernon-Woodberry Mills at Baltimore, and Saco-Lowell Shops, engaged in engineering and sales work. Mr. Stevenson is survived by his widow and three sons, Robert, John, and William. His mother Mrs. Findlay Stevenson of Lowell and three sisters also survive him. He was a member of the Worthen St. Baptist Church of Lowell, Kilwinning Lodge A.F. & A.M., Mt. Horeb Royal Arch Chapter, Alumni Association of Technology, the Chemists Club of New York, and the Akron and New York branches of the rubber section of the American Chemical Society, the Rhode Island Yacht Club and other social clubs. The Class extends its sympathy to Mrs. Stevenson at this time.

William S. Lucey is manager of the Grays Harbor Pulp and Paper Company, Hoquiam, Wash. Last spring he went to Europe on business and visited France, Switzerland, Germany, Holland, and Belgium, and also went to Australia on a pleasure trip. — Milton E. MacGregor continues his professional work teaching mathematics in the city of Boston. He received his Master's degree in mathematics at Boston University in June, 1929, having as a thesis "A Study of Proofs of the Fundamental Theorem of Algebra." Within the past few months he has delivered papers on "The Teaching of Factoring with Remarks on the Lowest Common Multiple," and "An Experiment in Individual Advancement in an Algebra Class." Mac lives in Needham, Mass. His son entered Dartmouth this fall.

Herman W. Mahr is with duPont Company at their Dye Works in Wilmington, Dela., as superintendent of a large section of the plant. His work is somewhat specialized along production lines, being confined mainly to taking over old plants or operations needing rehabilitation, or processes which are newly born in the laboratories and getting them going on a plant scale. The most interesting work of this type in which he has had a hand was the manufacture

of tetraethyl lead, which is used in the well-known "Ethyl Gasolene." — BRYANT NICHOLS, *Secretary*, 2 Rowe Street, Auburndale, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1908

The second Reunion dinner of the 1930-31 season will be held in the Faculty Dining Room, Walker Memorial, Tuesday evening, February 10, 1931, at 6:30 p.m. This season, the same as last, there will be only three get-together dinners, so if you miss the one in February you won't have a chance to meet the boys until late in the spring. Won't you make your plans right away to attend the dinner in February? Plans for our Twenty-Fifth Reunion are already being discussed, and we are sure the next dinner will be particularly interesting.

We have just heard of another loss in the ranks of the single men in the announcement of the engagement of John Gianella of Brooklyn to Miss Doris Roselle Harnett of Bermuda. According to the newspaper report the wedding was to take place last summer. We judge by now that John is an old married man. Please accept our congratulations.

Grenville Bridgman, who is President of the Mining and Metallurgy Society of America, has been elected an honorary member of the Chemical, Metallurgical and Mining Society of South Africa. — J. Worth Maxwell, who has been manager of the San Luis Potosi smelter of the American Smelting & Refining Company, has been promoted to the position of assistant general manager of the Mexican smelting department of the American Smelting & Refining Company with headquarters at Mexico City. — Percy Handy, for many years connected with the Boston office of John C. Paige, is now associated with Russell, Fairfield & Ellis. Handy tells me that when recently in Chicago he had a chance to play golf with Scannell and Wemple. McGowan had also planned to be with them to make a foursome, but couldn't make it at the last minute. — HAROLD L. CARTER, *Secretary*, 185 Franklin Street, Boston, Mass.

1910

Pretty slim pickings for the '10 Notes this month, but I hope the Secretary's letters will soon begin to bear fruit. Robert S. Breyer announced his retirement from the automobile business and says that he will in the future devote his time to his private interests under the name of Robert S. Breyer Company, Ltd., 830 Tenth Place, Los Angeles.

Saw Karl Fernstrom at a tea-fight at the Buckingham School the other day. He kindly offered to help me, so if you don't send in some notes soon, you may have several of us on your necks! — DUDLEY CLAPP, *Secretary*, 40 Water Street, E. Cambridge, Mass.

1911

"On to Dennie's Douglas Inn, June 26 to 29!" is the '11 battle cry on the eve of our Twentieth Reunion. From informa-

1911 *Continued*

tive suggestions on return cards and the talk-around at our Class Dinner at Walker Memorial on October 10, the decision was reached to go on the last week-end in June to Douglas Hill, Maine, and of course include the ladies.

O. W. Stewart, I, is the Chairman of the Reunion Committee, with Obie Clark, II, Carl Ell, XI, and Carl Richmond, I, members of the main committee, with Jack Herlihy and Dennie, of course, ex-officio. Mrs. Stewart has graciously consented to head the ladies' committee and with Mrs. Denison will start at once planning social features of the affair.

There was a new record made at Technology on October 10; we didn't have 11 men at an '11 dinner. We had but eight — Earnest Batty, Obie Clark, Dennie, Carl Ell, Stan Hartshorn, Jack Herlihy, Carl Richmond, and O. W. Stewart. Several of the boys who almost always attend, happened to be tied up that evening, as for example, Alter, Comstock, MacPherson and Merrill, but many messages were sent in as requested. For instance, here are widely contrasting views from two married men, both graduates in Course I. One says: "I would vote to include the ladies, as making for a better time all around." The other: "I am not interested in reunions that are co-ed." As at our Tenth and Fifteenth Reunions we'll include 'em.

Harry Tisdale, X, of Schenectady wrote that he was still in favor of Lake Placid Club in the Adirondacks, but would go wherever it was. No other definite locations were suggested other than the two mentioned, although Douglas Inn received some interesting additional comment. Ted Van Tassell said: "I certainly do like Dennie's hostelry — and such good food. Wherever else is suggested would have to draw a much larger attendance to get my vote away from Dennie's." — Erv Young, who like Ted has visited Douglas Hill, wrote: "I have seen Dennie's place and you can put me down as in favor of the Twenty-Year Reunion of '11 at Douglas Inn." — Here's one from Marshall Comstock: "Douglas Inn would seem to offer possibilities for an intimate Reunion and I'm for it unless Dennie thinks we will wreck the place." — Also Yereance tersely wrote: "Why not have the Reunion at Dennie's place in Maine?" while an element of humor was injected by O. D. Powell, I, who wrote: "Having been unable to attend a Reunion thus far and having no criticism of previous ones, I have no suggestions, but am open to some as to how I can get to the next one."

Mid-way in October another '11 man appeared on Douglas Hill, this time Lester Cushman, IV, of Boston. Hearing of the Reunion June 26-29, he said, after looking Douglas Inn over: "This is the place and count me in." In other words, seeing is believing, classmates, so make your plans now to spend the last week-end in June with classmates at Douglas Inn, Douglas Hill, Maine, 33 miles northwest of Portland off the west shore of Lake Sebago. Bring your family, too. — ORVILLE B. DENISON, *Secretary*, Douglas

Inn, Douglas Hill, Maine. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

When W. R. Glidden, I, was studying structures under Professor Spofford, nearly 20 years ago, it didn't scare him as much as it did some of the rest of us. Seems as though he was able to make faces right back at it. At any rate he's been building bridges for the State of Virginia for a good many years, and we guess they're good ones. Just a few weeks ago we passed over several of them in the bus running from the Old Dominion Line wharf in Norfolk to Virginia Beach, and they looked o.k. for all we could tell. Glidden has been prevailed upon to write us a letter which we take pleasure in presenting.

"I have been in Virginia," he says, "for over 14 years, having been connected with the Virginia Department of Highways during the whole of this period and have grown up with the organization. As you know, there has been a big expansion in highway work during this period. I was put in charge of the bridge department shortly after my arrival here and have continued this work ever since. I have found the work very interesting, particularly in the changes that are being continually made in the science. Also, I have been connected with the Virginia Mechanics Institute for the past 13 years, teaching strength of materials and applied mechanics. I feel that I have performed a real service in this work and have helped many young men to obtain better positions. In fact, every man who works in my office has received some benefit from this school.

"I have one son, who is now in the last year at high school and who hopes to enter Dartmouth next fall. He does not want to be an engineer. I rarely ever see any of my old classmates except for an occasional trip to Boston, which I visit once in a while. I have not yet taken up golf as I am afraid if I did it might interfere with my business. I have always been very much interested in music and have lately taken up the serious study of the piano, and considering my age and total unfamiliarity with the instrument before starting, they say I have become quite proficient."

It seems that a few secretarial apologies are in order. And it is your smart-alec Assistant Secretary who has to take the rap this time. The first apology goes to Page Golson, VI. In the November issue we accused him of failing to send a letter which he had promised. All the while his letter was actually in and printed in the October issue. Next in order for an apology comes James A. (Doc) Cook, VI, of Lynn, Mass. He sent us a letter and a contribution way back last July. We put the contribution in our pocket and the letter in the file. And there it remained until just the other day. Doc and Mrs. Cook went to the N. E. L. A. Convention in San Francisco and took in many of the scenic treats of the Southwest, the coast, and came home via the Canadian Rockies.

One by one the old standbys of the New York bunch are being drawn away from the Metropolis. The most recent departure noted, is that of Lester M. White, X, whose business connections with Roessler and Hasslacher Chemical Corporation, have required him to move to Niagara Falls. Although he lived in Perth Amboy, quite a distance away from New York City, White was always ready to come in for an evening meeting. He writes that he is looking forward to the Twentieth Reunion and is ready to help all he can to promote it.

In a recent issue we reported hearing that Bill Hammerstrom, II, had been ill. Mrs. Hammerstrom (who is also a Technology graduate, Course V) writes us that Bill is still suffering from the effects of a nervous breakdown. We trust she will not object to our quoting her letter in part. "Bill wished me to write you acknowledging receipt of the snapshot of the June Class Reunion at Swampscott. He was delighted to receive this as a souvenir and sincerely hopes to be a part of the Reunion in 1932. I regret to write that he is still much under the weather, but, I believe, on the road to recovery. He is suffering from a nervous breakdown and, as you know, recovery from such an ailment is slow. I myself, am an alumnus or rather I should write an alumna of Technology (Class of '06) and so we both take great interest in Technology doings. We have two sons, aged 15 and 12 and we hope at least one of them will add Technology numerals to his name. This summer we made a very pleasant acquaintance with Henry C. Dunbar '12, visiting our next door neighbor." The Hammerstroms reside at 7 Vista Avenue, Lynchburg, Va. We are sure that Bill would appreciate hearing from some of the members of Course II.

And now we take a certain malicious pleasure in reporting that one of the few remaining, and most stubborn of Class bachelors has joined the ranks of us benedicts — whatever that means. R. J. (Bob) Wiseman, VI, was married on October 29 to Agnes Ruth Troy, of Paterson, N. J. The ceremony took place in Saint John's Church, Paterson. The marriage ceremony, which was followed by a Nuptial Mass was celebrated by the Reverend George Wiseman, brother of the groom. The bride was given away in marriage by her brother James J. Troy, and was attended by Mrs. James J. Troy, her sister-in-law, as maid of honor. Your humble Assistant Secretary was happy to have the privilege of being best man for Bob. Later the bridal party, with the two families and intimate friends met at the Swiss Chalet, Arcola Park, for the reception and wedding breakfast. Mr. and Mrs. Wiseman have sent out "at home" announcements after December 1, at 466 East 39th Street, Paterson, N. J. Don't ask us to describe the gowns. We heard our better half and some of the other guests talking about them in words and expressions that only the feminine intellect can ever understand. We are sure that we express the sentiment of the entire Class in saying, "congratulations, Bob,

1912 *Continued*

and all best wishes." — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. MCGRATH, *Assistant Secretary*, McGraw Hill Publishing Company, Inc., 10th Avenue and 36th Street, New York, N. Y.

1914

The gatherings of the Class of '14 have never seemed the same since Stirling Harper moved out to Chicago. Not only do we miss his genial smile, but also his ever-inspiring example as the father of five sons. It was, accordingly, most natural that while on a recent visit to Chicago, your Secretary should look up Harper. He was readily found as architect with Bennet, Parsons and Frost. While somewhat worried over the general depression in building activities, Harper still retains his smile and courage. It was a genuine pleasure to be with him again. Unfortunately, time did not permit looking up our other Chicago architect, Ralph Salisbury, but Harper reported that he sees Ralph from time to time, and that he is doing structural engineering in the architectural offices of H. V. Van Holst. How Taylor, who was at one time associated with Salisbury in Chicago, is now back at Adrian, Mich., where he has his own architectural office.

A most enjoyable forenoon was spent with Bob Patten, who is with the Edison Electric Appliance Company in the famed Cicero district just outside of Chicago. After much scorning of electrical courses inflicted on the mechanicals at Technology, Bob has repented because he has now turned almost an electrical engineer. He is an engineer in the heavy duty division of the company, and designs such trifling items as electric bake ovens weighing 20 tons each — ovens where dough goes in at one end and bread comes out of the other. Huge ovens for industrial processes, equipment for hotel and ocean liner kitchens are among his specialties. Bob's younger brother Ray, '21, has turned his Institute training into art, and is the art designer of the household appliance products of the same company. Any Institute man who thinks that Technology training kills artistic imagination should visit Ray Patten's studio.

Bob said that he had recently heard from Roy Parsell, who for many years has been at the Winchester plant in New Haven. At last, Roy has folded his tent, and following the custom of the orient, now dreams of rugs. He has joined the staff of the Mohawk Carpet Mills of Amsterdam, N. Y. This position of Parsell's fills a long-felt want for our Class. Ted Gazarian has for some time taken care of our oriental rug requirements, and now we find Parsell ready to supply authentic domestic copies of priceless pieces from oriental palaces — with apologies to Mohawk's advertising agency.

Your Assistant Secretary, George Perley, recently drove up to Boston and made a few hasty calls before returning to New York. Like Harper, he is anxiously awaiting the return of more building. — Over

the Columbus Day triple holiday, your Secretary had the pleasure of journeying to Maine to be the guest of Dean Fales. Needless to say, it was a most enjoyable week-end. Dean is none the worse for his initiation into the American Legion during its recent convention in Boston. In fact, he appeared to have improved with training. — From down on Cape Cod comes word of the arrival of Florence Marie Dixon on October 3. This is Donald's second daughter, and he has a son besides. — HAROLD B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, Long Island, N. Y.

1915

The following good letters continue to reflect the splendid spirit and interest of our men in Class affairs. They make writing easy for me and should make reading interesting for you. From New Haven Vincent Maconi, I, writes: "I was quite pleased to receive your recent letter which reminded me of the very fine time I had at Marblehead. It might interest you to know that I did not come in contact with one of our classmates who did not believe that our Class Reunion was 100% successful. I am hoping that our next reunion will be at least as good. About a month ago Joe M. Livermore, one of our classmates who had been living in Charlotte, N. C., came to work for us. There is no doubt that Joe will try to see some of you boys again in the near future. Please accept my best wishes for your happiness and success. Also give my regards to Frank and any other of our classmates. . . ."

From Boston Harold Colby, II, sends in: "I want to thank you very much for your letter of September 15 in expression of your appreciation and Frank Scully's. I, in turn, appreciate the thoughtfulness in your expression and feel that the other members of the class must also reflect this same attitude. It is a wonderful spirit and one which I personally hope will continue. You will recall the picture that was taken at Marblehead during the Reunion and would like to offer the suggestion that someone such as Frank Scully or yourself, who is sufficiently acquainted with the members in that group, make up a list giving the names with nicknames and addresses of the members in the picture. This could be done by starting from right to left as they numbered off at the time the picture was taken. This list could be sent to each one of those who received the picture for I feel that they would appreciate attaching this information to their picture. I know that I would for one and would like to see that thought carried out."

From Westfield, N. J., Bob Mitchell, V, helps with: "I was very much pleased to receive your note a short time ago. I enjoyed our Reunion very much and am already looking forward to the next one." — Art Nelson's letter is particularly and refreshingly expressive: "I have received and thank you for your very nice letter of September 15 about our Fifteenth Reunion and sending Frank Scully's regards. I

would like to add that from what little I have served on committees and in various offices, I realize how much time and thought and effort you and Frank put into making our Reunion the success it was, while all that I did was to attend and enjoy myself. I am sure that your brand of Class spirit is a much more useful one than my own (I do not refer to 'Meduna')." — These letters are extremely gratifying to Frank and me, but, really, the success of our enjoyable Reunion was due wholly to the spirit, cooperation, and enthusiasm of the men who came. Let's continue that spirit and the spirit of these letters and keep our Class close together in the bonds of these fine old friendships.

Jim Tobey, IX, has recently published another book "Riders of the Plagues." From his publisher's foreword I quote: "A vivid and accurate description of some of the worst plagues that have afflicted the world. The origin and development of medical and therapeutical ideas. Reasons behind nutrition fads and the possibilities of prolonging life." Our congratulations to you, Jim, on this achievement. — From a recent Boston newspaper see what has happened to Johnnie O'Brien: "John H. O'Brien, who has been acting general manager of the Boston Garden was officially elected general manager having full charge under the direction of the executive committee, of the conduct of the Garden property." Congratulations, Johnnie, on such a good job. — In the October 25 issue of the Executive's Bulletin of the Standard Oil Company of New Jersey is this announcement: "Louis H. Sepfle, V, who at present heads the steam and paraffin departments at Eagle Works, has been promoted to assistant superintendent of the Eagle Plant at Elizabeth, N. J." Louis went with the Standard Oil Company in May 1919 at the Bayway Plant and transferred to the Eagle Plant in June 1922. We are glad to hear of this splendid promotion and we extend to him our best wishes for success in his new position.

There will soon be a Boston dinner with Carl Wood's movies of the Reunion and bowling. Later, or as soon as can be arranged we shall have a New York dinner also. When you receive this Review there will be left but a few shopping days to Christmas, so I send you my sincerest wishes for a very happy and enjoyable holiday. — AZEL W. MACK, *Secretary*, 379 Marlboro Street, Boston, Mass.

1916

Plans for our Fifteenth Reunion next spring are already well under way. The committee on time and place is now functioning 100%, and I expect to be able to make a formal announcement to the Class very shortly. Start now to arrange your business affairs and family so that you can be present. If you attended the Tenth Reunion at Fishers Island, there is no question but that you will be present with us next spring. If you were not able to make Fishers Island, I am sure that you will not want to miss the Fifteenth.

1916 Continued

I was pleased to receive another post card from Jeff Gfroerer recently. He seems to be able to take a little time off now and then from his duties with Adam Opel, A. G. This time he was visiting Munich and Oberammergau. Jeff reports that the beer is excellent. We all know that anyway and don't see why he need bring that up.

The single men seem to be very much better correspondents than our married brothers. (Draw your own conclusions.) The following was recently received from H. von P. Thomas, who is associated with the Bussmann Manufacturing Company in St. Louis: "I am sorry to say that I have been very much out of touch with any of my former classmates, although we have a fine Technology Club here in St. Louis which meets about twice a year and they are a mighty fine group of men."

As to my own activities, I am at present holding down a job as Merchandising Manager for the Arlington Rubber Company, Dorchester, Mass. This may seem a long ways from Engineering with my Technology training, but I find it is invaluable to me even in merchandising and advertising. The fact is that I can almost recommend an engineering course for all advertising men or salesmen, as it has a tendency to make them keep their feet on the ground. My family statistics are a negligible quantity as my chief interests are wrapped up in trying to successfully conduct my present work. Furthermore, I am still happy though single and spend most of my spare time trying to prove it.

Isidor Richmond contributes the following most interesting letter: "Upon leaving Technology, I went down to Brunswick, Maine, where I worked with Felix A. Burton '09, architect, for about a year on some buildings at Bowdoin College. With the outbreak of the War, I enlisted in the Naval Air Corps, and was sent over to the Walker Memorial at the Institute for my ground school training, and later to Pensacola, Fla., for my training as a flyer. After learning to fly there and receiving my commission as Ensign, I was sent to the Chatham Air Station, where I stayed until the end of the War doing patrol duty in Flying Boats.

"The War over, I worked a short time in Boston and then went abroad with the Harvard Reconstruction Unit. This was the summer of 1920. The Harvard Unit did reconstruction work in the devastated areas of France, my part being on the reconstruction of the Church of St. Jacques at Rheims. Upon my return to America, I went out to Cleveland where I worked upon a large school building program under Mr. W. R. McCornack '03 for the city of Cleveland. The year of 1922 to 1923 was spent in the employ of Cram and Ferguson, Architects, in Boston.

"In the spring of 1923, I competed for and won the Rotch Travelling Scholarship in Architecture, entitling me to two years of foreign travel and study. The next two years were spent in the glorious combination of traveling, studying, sketching, and loafing in the various

Central European countries and in Northern Africa, with some concentrated study in Paris at the American Academy in Rome.

"In 1925, I opened offices at 248 Boylston Street, Boston, for the independent practice of architecture, in which I continue to be engaged. In the past five years, I have enjoyed a varied and interesting practice, having been the architect, among other things, for a rather large furniture warehouse, several factories, a school in the Tudor Gothic style, a fine fur store in the modern style, and a hospital in the Colonial style. For the past three years, along with my practice, I have been instructing in design in the Architectural Department at Technology.

"The state of single blessedness is still my lot. I am looking forward with a good deal of pleasurable anticipation to the Fifteen-Year Reunion of our Class. I only hope that it will equal the Ten-Year Reunion at Fishers Island, which I attended in 1926."

Another bachelor is Charlie McCarthy. Charlie is air-minded and writes the following: "I am now located in Hartford, Conn., as Chief Engineer of the Chance Vought Corporation, with which company I have been connected since my resignation from the Navy some four years ago. We build the Vought 'Corsair' airplane, a two seater observation airplane, which is the standard U. S. Navy Observation plane and is to be found in considerable numbers on the aircraft carriers, equipped as land planes, and also mounted on floats on top of the catapults of the battleships and cruisers. We also furnish air amphibian type landing gear for those who cannot make up their minds ahead of time whether they want a land plane or a seaplane.

"Our company has recently moved to Hartford from New York to occupy the new plant which was built for us and which with all proper modesty, we admit is the best arranged and equipped aircraft factory of its size in the country.

"Our plant is adjacent to that of the Pratt and Whitney Aircraft Company who build the Wasp engines which are used in all our airplanes. Pratt and Whitney Aircraft and the Chance Vought Corporation are both subsidiary companies of the United Aircraft and Transport Corporation, and a flying field for our joint use is being constructed immediately behind our factories. The field will be ready for use early in the spring and all air-minded classmates are cordially invited to drop in at any time. Those who still prefer to use the old-fashioned automobile as a means of transportation will find the latch string out just the same.

"I suppose I should not forget to mention that along matrimonial lines, I have met with no success whatever and am still a bachelor — more or less lonely as the case may be. Whether my condition is one meriting sympathy or congratulations, I leave to you married men to decide."

Another of our classmates associated with the United Aircraft and Transportation Corporation is George J. Mead. It

has recently been announced that he is Vice-president in charge of engineering and will now head a newly-organized experimental and research division which is to function for the United group. He will work to coordinate the engineering endeavors and will be located at Hartford. Mead has also been named chairman of the executive committee of the Pratt and Whitney Aircraft Company.

Gene Lucas writes from the Brass City in Connecticut: "We (my wife and our two children) are still living in Waterbury where we have now resided for the past seven years, the last five of which we have occupied what is reputed to be the oldest house in the city, dating from 1741. It's about as big as a minute but quite nice we think. I am still with the American Brass Company here in Waterbury and see Jack Freeman occasionally. He lives some ten miles or so from here in Cheshire, so we have not been able to get together very much. Have also seen Warren Barker twice recently. He certainly has stepped up in the world."

George Sutherland is now assistant general superintendent of the New York and Queens Electric Light and Power Company. He reports that he is living in the peaceful village of Douglas Manor on the north shore of Long Island. His biggest news is the arrival of his son, George Trench, on August 19. The proud father is doubtful if he will ever make the Technology crew because young son doesn't take to water. — Don Webster is now located with the Garlock Packing Company at Palmyra, N. Y., as controller. He reports living on a shady street in that city and that he is happy in his new association. He suggests that all classmates passing through Rochester take time to give him a ring on the phone — Palmyra 270.

Hal Gray is now Vice-president and General Manager of the Wachusett Shirt Company located at Leominster. They specialize on shirts, pajamas, and night shirts. I can vouch for the quality of the second item for Hal sent me a pair of his best Persian color combination — they are so hot that I get along comfortably without an extra blanket these cool nights. — Walter Littlefield is located at 97 Boston Fruit and Produce Exchange, Boston. He reports: "Sorry, but when there ain't no news why there just ain't."

— HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, *Assistant Secretary*, 7338 Woodward Avenue, Detroit, Mich.

1917

On a tour of laboratories in October conducted by the National Research Council, I found Win Swain in the group. He is with the J. Henry Schroder Banking Corporation at 48 Wall Street, spending one-half his time with them and the other half in the study of the education of the growing child with specific reference to his two daughters. We met Hegenberger at Wright Field and were told something of the very interesting work that he is doing there. He is engaged on instrument design and development.

1917 *Continued*

Paul Bertelsen dropped in to say hello and told of the round-the-world trip that he made a short time ago for the First National Bank of Boston, taking Mrs. Bertelsen with him. He reports that Stebbins is now operating his former Atlantic Works, at present owned by Bethlehem.

Principal Stanley W. Hyde of North Yarmouth Academy at Yarmouth, Maine, announced at the student assembly of the school on October 6 the gift of \$120,000 to the school's endowment fund by Cyrus H. K. Curtis, Philadelphia publisher. This brings the total of Mr. Curtis' gifts to Stairs Academy in the past year to more than a quarter of a million. School opened on September 15 in the magnificent new building designed by Lester Beal '18 which was the gift of Mr. Curtis.

Ed Atkinson is back at the Institute, representing the Army in the Military Science work. Presumably he derives much help from his notes of Major Cole's lectures on how to fight mosquitoes.—RAYMOND S. STEVENS, *Secretary*, 30 Charles River Road, Cambridge A, Mass.

1918

After wrestling a master's degree from the Aeronautics Department, Frank O'Connor resigned his position with the Curtiss Ground School to go into business with several other young world beaters under the name of Aeronautical Service, Inc. Frank professes to "furnish some of the minor technical knowledge." If you want a plane designed, an aerial view of your country estate, or lessons in how to become an aviator, consult the Aeronautical Service, Inc. (Adv.)

Added to these activities Frank has two volumes to his credit: "The Theory of the Airplane Engine," intended for high school consumption; and "Handbook for Pilots," 1,000 questions and answers for those who need a trot.

At the All-Technology Reunion last June, Arthur Hardy covered the Class with illegitimate glory by his demonstration of a new musical instrument. Yes, the glory '18 got covered with was illegitimate and here's why: he graduated from the University of California in 1917, coming to Technology that fall for work which lasted less than three months because the 23d Photographic Section needed a commanding officer in France. Back he came in the fall of 1919 as an instructor in optics. The catalog didn't call him an alumnus then, but when he returned as a professor in 1922 after a two-year absence with the Eastman Kodak Company, he found himself welded and riveted to the Class of '18. So when he developed a glass disc upon which concentric sound tracks are recorded photographically, '18 took its share of the credit. The disc rotates between a source of light and a photo-electric cell. A series of shutters operated from the keyboard, control the passage of light through the sound tracks. With the volume and exterior beauty of a three drawer chiffonier, Hardy's unique instrument can do all the stunts of a giant Whurlitzer (see the Re-

view of May 1930). It is also Hardy to whom most of the credit is due for the color analyzer soon to be placed on the market by the General Electric Company. The Editor has written a compelling technical description of how to plot a curve of Highland green or deep Rubicelle, using wave lengths and reflecting power as arguments but he hazards the guess that Mrs. Hardy buys the professor's neckties just the same.

This column has been happily free from the necessity of recording some of the darker things of life; a freedom which at best can be only spasmodic. We record with sympathy the death of Mal Eales' mother in September, and of Gretchen Palmer's father in October.

No one who knew the inimitable smile of Cliff Bellis as an undergraduate or the contagion of his good humor at our Tenth Reunion can learn without a pang that he passed away early in September. Bright-eyed and eager he came to my office last June to ask about the Class dinner at the Engineers' Club. His passing is all the more tragic in that it was so unnecessary. There are times in life when the unexpected encouragement of an understanding friend may make a world of difference.—F. ALEXANDER MAGOUN, *Secretary*, Room 5-328, M. I. T., Cambridge A, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, 51 Houston Avenue, Milton, Mass.

1919

The extensive business depression has apparently affected our Class Notes but we hesitate to attribute the situation to over-production. However, in company with the economists we hope to see increased activity and to have more notes to offer you in subsequent issues.

In these days when college sports have entered the field of big business we suppose a donation of \$50.00 to further athletics at Technology sounds pretty small, but we are pleased to record that such a donation made by our Class was appreciatively received.—We had a letter from Joseph Newell and he tells us that there have been no meetings of '19 men in Boston for some time. This surprises us as Boston used to be an active section for '19 men. May we suggest that someone take the initiative and have a meeting during November about which we will advise in the next issue. Newell is of the opinion that the interest in the Institute varies as the square of the distance from it. We do not know as we quite understand this, but maybe it is true.

You will be interested to learn that George McCarten called to see us recently and proudly announced the birth of a daughter, Peggy Ann. This is the second daughter.—We had a call from Miles Connors who is now with the Adams Express Company. No, he is not wrestling egg crates; he is in the securities department engaged in investigation and research, similar work to that which he was doing until very recently with L. F. Rothschild and Company of New York City.—Don Way has recently been elected a Governor of the Technology

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Club of New York City. Our Class is well represented on this Board of Governors as Way is serving along with Oscar de Lima.—Paul Swasey is now located in Weldon, N. C., address Box No. 577.

May we wish you all a Merry Christmas and a Happy New Year. Please note the new address of your worthy Secretary.—WILFRED O. LANGILLE, *Secretary*, 7 Willow Street, Cranford, N. J.

1920

I have two very important birth announcements; one is that of Alan Delafield Burke, born August 21. Al dropped into the office the other day so I was able to extend to him the congratulations of the Class. Al is the able and efficient New England manager for the Sharpless Separator Company. Kenneth Jacob Roman, Jr., was born September 6. The Class of '20 extends their heartiest congratulations to you, Ken.

I learned indirectly that Bunt Murphy is back from the Far East and is now located at Hartford, Conn. Also Foster Doane has moved from this vicinity to Glens Falls, N. Y.—Buck Clark dropped in for a minute not long ago for a very welcome and pleasant visit. He is still in the bond business in Hartford.

I have no apologies to make for the skimpiness of these notes or for the fact that no notes appeared last month. I simply lack the imagination to manufacture this material. Why not drop me a line or stop in at 932 Statler Building when you are in Boston?—HAROLD BUGBEE, *Secretary*, 9 Chandler Road, West Medford, Mass.

1921

Introducing D. C. Jackson, Jr., VI-A, as our principal speaker this month—and we know every member of the Class joins us in congratulating Dugie and in extending our best wishes in his new move. Here he is to tell the story in person: "I am about to make another move, this time to Kansas. To refresh your memory of my peregrinations, I'll give you a brief résumé. When I left the Institute after getting my S.M. in 1922, I went to the University of Missouri where I spent a pleasant year on the staff of the electrical engineering department. Then for two years I was assistant professor of electrical engineering at Trinity College, now Duke University, teaching both electrical and mechanical engineering subjects. In July 1925, I came to the University of Louisville to be in charge of the Department of Mechanical and Electrical Engineering and to help organize the Speed Scientific School which was established that year. On September 8, 1930, I leave for Lawrence, Kan., where I shall be head of the Department of Electrical Engineering, College of Engineering and Architecture, University of Kansas, under Dean George C. Shaad who was on the staff of Technology's Department of Electrical Engineering from 1906 to 1909. My home address will be 1800 Indiana Street, Lawrence, Kan., and, of course, the latch-string is always out wherever we are."

1921 Continued

It will be remembered that, about a year ago, Dugie managed to find time in addition to his administrative and pedagogical duties (though for the life of us we can't figure out how) to act as co-editor with Dr. W. Paul Jones of the University of Louisville in producing a volume entitled "The Profession of Engineering," which was published by John Wiley and Sons. This volume consisted of a number of essays on the several major branches of engineering and was intended for the orientation of freshmen and sophomores in engineering schools and for the information of high school students. Now Wiley's announce a new volume in the series by these same editors called "This Scientific Age" and containing about 25 Essays written by men of recognized scientific and literary ability and devoted to the non-technical aspects of this age of science.

Apropos of the above we wish to remind you all that the co-editors of this column will highly appreciate receiving an essay from each and every one of you for inclusion here. Don't wait for the other fellow to send in his story because of that mistaken idea that yours is not of interest. To help the employment situation, sit down now and write a note to Ray or your Assistant Secretary or both of us will be out of jobs!

We have another literary star in our midst, S. M. Jones, VI-A, who is co-author with J. T. Lusignan, Jr., '24 of an article appearing in the September 20 issue of *Electrical World* entitled, "Impulse Ratio Limitations." Sam and Dugie prove the theory that good "co-operatives" make good co-authors, but unlike Dugie, Sam has failed to be a good correspondent (don't hyphenate that word on peril of your life!) or he would have long since informed us what he is doing with the Ohio Brass Company when our records still insist he is with the Alabama Power Company. Well?

We had a fleeting glimpse of E. R. Haigh, XV, recently when he paused at the Laboratories just long enough to say, "hello." Randy is a high power executive with L. F. Bachrach, Inc., 507 Fifth Avenue, New York City, but otherwise is just the same old Randy. We still have hopes of cornering him long enough to get a real story for this column.

Turning now to Dan Cupid department, we hasten to express congratulations and good wishes to two recently married couples and a third whose engagement has just been announced. Says the Providence R. I., *News Tribune*: "Mr. and Mrs. Lester E. Inman of Laurel Hill Avenue, have announced the engagement of their daughter, Emma Frances, to Mr. Leon A. Lloyd, II, son of Mr. and Mrs. John A. Lloyd of Mapleville, R. I. Miss Inman was graduated from Wheaton College with the Class of 1927. Mr. Lloyd is now connected with the Narragansett Electric Company of Providence." — From the Palmer, Mass., *Register*: "Hon. and Mrs. Fred Wilder Cross of South Royalston, Mass., announce the marriage of their daughter, Bertha May, to Mr. Edgar Stuart Russell, II, son of Mr. and Mrs. G.

Edgar Russell of Brockton, Mass. Mrs. Russell is a graduate of the Boston University School of Education. Mr. Russell is associated with the Stone and Webster Engineering Corporation in Pottsville, Pa., where he is an industrial designer of the mechanization and electrification of the Philadelphia and Reading Coal and Iron Company's anthracite properties. He is a member of St. George Lodge, A. F. & A. M., Massachusetts Consistory, Aleppo Temple, and the Brockton University Club." — We have a beautifully illuminated wedding announcement which reads: "Dr. Ross Parker Cox announces the marriage of his daughter, Katharine Miller, to Richard Wellington Smith, XII, on August 18, 1930, Lake Junaluska, N. C. At home 41 Willow Avenue, N. E., Peachtree Hills, Atlanta, Ga." Thus does Dick confirm his statements of a number of years ago anent the "Southern Belles" and we are personally especially interested to note that so eminent an authority selects our own native Tarheel State. We hope Dick will take some time off from his duties as geologist on the Georgia Geological Survey to tell us more about himself and his doings in these last few years of silence. We'll even promise to cease printing the "R.W.S. please notice" comments if he will write now!

In conclusion whereof, a Cheery Christmas and a Nectared New Year to all. May you, in that superabundance of Christmas spirit, write that note to your Secretary or Assistant Secretary which will insure for them a real happy New Year! — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Mfg. Company, So. Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Bell Telephone Laboratories, Inc., 463 West Street, New York, N. Y.

1923

The notes this month will be a bit short, largely because your Secretary is away from his base of operations. These notes are written from Kansas City, and with the help of air mail I hope they will reach the Review office before the deadline of October 25. That deadline is a tyrannical thing and is one reason why sometimes the notes seem to be several months old by the time they appear. I know enough about the mechanics of getting stuff in print to know that it's almost impossible in a magazine of the high quality of The Review, to rush such stuff through, so you'll just have to bear with it.

For example, I would like to have been able to announce ahead of time the dinner which, as I write this, is being planned by the New York 1923 Club for the evening of October 29 at the New York Technology Club's quarters at 22 East 38th Street, about which Pete Pennypacker, President of the club writes. A considerable turnout is expected and, no doubt, several from outside New York would attend if they knew of it. I like to get to the meetings myself when I can, but this date will find me in Birmingham, Ala., so that's out. Pete sends in the fol-

lowing description of a recent get-together of the New York group, which I am quoting verbatim: "On September 27, 1930, the New York Club of 1923 held an outing at Echo Lake, New J. Ladies were invited, and a group of 18 turned out to enjoy a frolic of games, stunts and boating, followed by an open fire and a delicious supper cooked over the flames. Shorty Chamberlain won the prize for the afternoon in finding the treasure in a treasure hunt. Lem Tremaine won the boat race against such lusty competitors as Jim Brackett, Al Pyle, Charlie Roche, and Chan Clapp. Pete Pennypacker and Pres Woodling waged a hot battle over the outdoor ping-pong table, and Jack Keck proved a very able captain of the winning baseball team. After supper, the group formed a circle around the fire and told bed-time stories and sang until the curfew struck. It was voted a very successful party and every one was reluctant to leave."

Under the heading of progress I have one wedding and three births to announce this month. I saw Howard Dexter in Pittsburgh a few weeks ago who reported that Frank Hassler was getting himself married in October, so that item is probably a fact by now. — A card from Mr. and Mrs. William S. La Londe, Jr., announces the arrival on August 17 of Marilyn La Londe. Bill was, at last report, assistant professor of civil engineering at the Newark College of Engineering. — Quoting from another card received this month: "Frosty Harmon and Helen Harmon, senior partners of Harmon and Harmon, take pleasure in announcing the acquisition and appointment of Marin Harmon as Junior Partner, effective September 18, 1930, 2845 Van Ness Avenue, San Francisco, Calif." Congratulations, Frosty, but is it a boy or a girl? — Had the pleasure of meeting Ray Holden for lunch here in Kansas City today. He is celebrating the arrival of a daughter, Betty Jean, on October 17. He is still doing industrial engineering work for the E. J. Dillon Company, accountants, one of the few XV men still sticking to the kind of work for which they trained. — HORATIO L. BOND, *Secretary*, 31 Concord Avenue, Cambridge, Mass.

1924

Your Secretary will for his part stick to weddings this time. On the 24th of June William John Lanagan was married to Miss Gertrude Catherine Kelley of South Boston. Lanagan is associated with his father, a clothier of Waltham, and is now living at 131 Weston Street, Waltham. — Our other wedding is that of William Martin Croft to Miss Ruth Katherine Gebhardt of Jamaica Plain, Mass., on July 8. They are now living at 18 Kingsboro Park, Jamaica Plain.

Your General Secretary has himself moved. It is a move of residence only. He is still with the Travelers Insurance Company doing supervisory work and is still unmarried. Class members did not make excessive use of the old address, but they are invited to keep the new postman

1924 Continued

busy. — HAROLD G. DONOVAN, *General Secretary*, 372 West Preston Street, Hartford, Conn.

COURSE VI

This summer and fall have been good to your Secretary, because they furnished him the first real excuse for writing that he has had in many a day. Address changes from the Registrar's office started the ball rolling, so here is where a few long-lost brethren may be found. Bert Donkersly is now selling for the Grinnell Company of Providence and anybody who is a possible customer for pipe-hangers and other products of this company will have to hide to miss Bert's system of getting the business. His home address is now 6 Welfare Avenue, Cranston, R. I. Sam Helfman has been heard from, and may be reached at 5854 Malburn Road, Pittsburgh. Vin Lysaght, who has been in Chicago for some time, now gives his address as 203 East 43d Street, N. Y.

We saw Walter Weeks in the spring and learned that he is in New Haven with the Winchester Arms Company. Henry Zeiger gives his address during business hours as the Monowatt Electric Company, New York City, and his home address as 1115 Dorchester Road, Brooklyn.

Weddings always furnish some news. The first we had the pleasure of attending was that of Ed Hanley to Miss Dorothy Frances Ward of Arlington. They were married in June and are now living in Schenectady, where Ed has been with the General Electric Company since his graduation from the Harvard Business School a couple of years ago. — Gene Cronin was also recently married to Miss Olive Fisher of Boston. Gene is District Manager in Boston for the New England Tel. and Tel. Company. We had the pleasure of swapping yarns a few weeks ago with Jack McCoy who came up from Elizabeth, N. J., to be best man at Don Moore's wedding. Don married Miss Elizabeth Borwick of Newton Centre, and is now living in Brookline. He is doing engineering work for New England Power.

Another new Benedict is Jack Stanton, who was married early in November to Miss Grace Daily of Arlington. Jack is a plumbing contractor in Cambridge and makes his home in Lexington. I presume that a great many more of the boys have been married since the summer, but just haven't let us in on the glad tidings. We are always pleased to get letters from any of our classmates, and you know news can't be made to order. If you like to see class news in The Review, send in some. Even if you don't care to disclose your own whereabouts you can send in what news you have of the rest of the boys. Let's have some before the next issue. — FRANCIS A. BARRETT, *Secretary*, New England Tel. and Tel. Company, 50 Oliver Street, Boston, Mass.

COURSE X

Good news for you this month. Letters from Charles Herrstrom and Henry MacMillan were received in answer to our urgent requests. Charles writes: "Your earnest plea for news for the Review

reached me just as I was about to leave for a few days sojourn in Washington. As you know, I am in the employ of the patent law firm of Mitchell, Chadwick and Kent, my title being Senior Assistant. The work is exceedingly interesting, and in my own case is largely concerned with interference proceedings. It involves, among other things, the taking of testimony, preparation of briefs, and oral argument before the Patent office. With that, I have a good bit of application work of the usual sort. One reason for my being permitted to handle interference practice on my own is that before going with Mitchell, Chadwick and Kent, which was a year ago last March, I was for two years engaged in deciding questions of that very sort in the Patent office. During that period, all chemical interferences — something like 75 — which went through to final hearing came to my desk for decision. I was at the time an Associate Examiner and was with the Examiner of Interferences as one of his assistants. Prior to those two years, I was in one of the examining divisions of the Patent office. Like the other, that position was interesting, if not especially lucrative. At the time, the staff of the Patent office included Tom O'Brien, Joe Shea, and other good classmates of ours at Technology. How long I shall be where I am now located is uncertain, but probably until next spring at least. After that — who knows? In the patent game as is often true in engineering, making a new connection may mean moving to another city; so perhaps next year will find me in New York, where so many Technology men seem to land. As to your question about the Family, there is only this to say: it increased 100% in June, 1928, when I took unto myself a wife, but since that time has remained constant. The Review carried a note about it, surprisingly enough, for there wasn't much to say except that the wedding occurred as scheduled. Agnese Marie Cole of New York and Washington became Mrs. H. on that June day. Talking about New York, I was there for a few days last June, cross-examining in one of the interferences elsewhere mentioned. I was busy as could be, but took occasion to look up Joe Shea at the Postal Life Building. We had quite a chat and had dinner together in the course of it. Joe is likewise a patent attorney and seems to be doing nicely. I hope this is what you want in the way of news for the Review."

The next day Henry MacMillan wrote from Elsmere, N. Y.: "Every time I think about it I have a guilty feeling for being so delinquent about writing. Your card reminded again and before I forget I'll just say hello. I suppose you have figured out from the lack of letters that we are all so busy doing big things that we have no time to write (or else, perish the thought, we haven't done anything worth writing about). Last time you heard from me I think I was in Rhode Island with the Stillwater Worsted Mills. Bob Mackie was there, too, and is still there now. They built three new plants — in Virginia, in the western part of the state

about 25 miles east of Hot Springs. One was a yarn mill, the second a weaving plant, and the third a dyeing and finishing plant. I went down to run the dyeing and finishing part of it. It was quite interesting to start up a new plant with local labor. The men knew nothing about the operations and almost without exception had never worked in any manufacturing establishment before. The town (Goshen) is right up in the mountains, is quite small (only about 200 population), and is about 25 miles from the nearest city, which is not large (Lexington and Stanton, each about the same distance). The location is splendid scenically. I was there from March to August, during which time we were able to get operations pretty well under way.

In August I had the opportunity to come up here. It was difficult to decide whether to stay in Goshen and grow up with the new project or to come here. For various reasons we thought it wise to change. So I am now working for the Albany Felt Company (Elsmere is a suburb of Albany). They make for the most part, paper-makers felts and in addition, all kinds of mechanical woolen materials, such as felt jackets for rolls, filter cloths, lithographing flannel and felt belts for various purposes. I think that's enough space devoted to myself. I haven't heard much from any of the gang. Brugmann, I see, has risen to the heights of professorship. Mackie, as I said, is at the Stillwater Worsted Mills. His job covers all the technical aspects of the business and he seems to be filling it to capacity. Do you know of any other fellows around here that I know?"

I saw Ted Simonton in New York City at a '24 supper the other night. He was trying to convince Charley Franks that marriage is the life. Ted still can sing those famous songs. He is a patent attorney, located in New York.

I have moved once again to the address given here. — WILLIAM B. COLEMAN, *Secretary*, 112 Seeley Avenue, Arlington, N. J.

1925

About 75 members attended the Class Dinner at the Hotel Kenmore, during the All-Technology Reunion in June. Those present who were conscious and desired to vote went into a huddle and elected the following officers: President, Frank Preston, II; Vice-President, Joe Russell, XV₂; Secretary-Treasurer, Henry Cunningham, XV₂. There was no solemn installation of officers, but the officers were inoculated into office by the absentee method. The good ship Twenty-Five is now in our hands and we are trying to do everything possible to avoid mutiny and keep her afloat. There is little money in the treasury and yours truly will not require a very heavy bond. No small measure of success of the dinner was due to the untiring efforts of Dr. T. J. Killian, alias Tom and his ever faithful watch dog, Blaze, who kept a constant eye on the black bag in which Tom carried the kitty. It has been motioned and seconded that we give them a rising vote of thanks.

1925 Continued

I am working on the Class endowment record and regret to say that is it very drab; will have more to say on this in the future. — Alex (Tony) Ulman was a recent visitor in the States but was expecting to return to Berlin, Germany, where he is employed by Goodyear. — Saw Arthur J. Brockelman at the Fisherman's Races at Gloucester; he is still keeping some nice girl out of a good home. — I know you will be sorry to hear of the sudden death of Perry Davidson, of banjo fame, in Cambridge during September. I wish to extend our sympathy to his wife and family through these columns.

Will the Course Secretaries please send me their current addresses. If any of you have a desire to say something, send it in. — HENRY V. CUNNINGHAM, JR., *General Secretary*, 43 Chestnut Street, Boston, Mass.

COURSES III AND XII

After a prolonged silence enough news regarding our roaming mining engineers has been accumulated to warrant a report. I. M. Symonds writes from Mapini, Durango, Mexico to say that he is now working for the Penoles Mining Company in their lead-zinc mill. He left Inspiration in May to work out a flotation flow sheet for the Christmas Copper Company and build up their chemical laboratory on the side. This required but a short time after which Sy and his family headed for Mexico. — It should be of interest to many of the miners to hear from W. H. Graves, Jr., who following a summer's work in Newfoundland with the Swedish American Prospecting Company is back at the Institute to complete his graduate work for a Master's degree, and in his capacity as a member of the mining department staff is rendering very able assistance in the development of the courses in geophysical prospecting.

No news of our miners would be complete without something about G. B. Blonsky who is turning out to be a professional globe-trotter. At last reports he was in Berlin, Germany and still connected with the Dorr Company. During the last eight months he has been sent out from Berlin on various ventures which have taken him to Poland, Italy and Egypt. — Your Secretary has managed to keep busy during the last few months. With the close of the school year he left for Kentucky early in June to join an experimental geophysical prospecting crew of the U. S. Bureau of Mines for a few weeks previous to the opening of the summer camp at Dover, N. J. On Saturday, September 20, he was married to Miss Evelyn S. Taylor at Chatham, Mass. Following the ceremony the couple left for a two weeks auto trip which took them through the Shenandoah Valley as far south as Roanoke, Va. — F. LEROY FOSTER, *Secretary*, Room 8-219, M. I. T., Cambridge, Mass.

COURSE XIV

Your Secretary was the only member of Course XIV, '25, present at the Reunion outing and banquets. A large number of

other members of the Class were present, however, particularly at the Class banquet, and a great time was had by all. Since that time I (as Secretary) have exchanged letters with Frank Klein, receiving in his letter an excellent snap-shot of his baby daughter Beverly. Frank has completed his studies at the Air Corps Engineering School, has done some metallurgical research in the Materials Branch of the Materiel Division, and is now on a new job specializing on aircraft fuels and oils. His schedule includes engine test work in the Power Plant Branch, and a period with the Ethyl Gasoline Corporation in New Jersey, after which he will be assigned to special research work at Wright Field, his present address (care of Materiel Division). He also adds that he had dinner with Clarence Thulin in Buffalo, where Clarence is now working with duPont Cellophane Company, his personal address being the Stratford Arms Hotel.

Ted Coyle's mailing is now given as 411 Washington St., Dorchester, Mass., but I have been unable to get in touch with him, and assume that he must be out of town a great deal in connection with chromium plating installations.

I continue to work at the laboratory of Lever Brothers Company, Cambridge and my mailing address is given below. I intend to circularize silent members of the Course this winter, but it would help a great deal if those who read these notes would write, giving their present addresses and occupations. — HOLLIS F. WARE, *Secretary*, 9 Orchard Terrace, Arlington, Mass.

COURSE XV

I was pleasantly surprised to learn from Al Prentiss that he has had himself completely overhauled as to wisdom teeth and tonsils — appendix came out previously — in preparation for the big event which takes place this November. Yes, Al has decided to commit matrimony (his words). By way of honeymoon they plan to come to Boston in December, so we should have more detailed news of the affair in a later issue of The Review. Al is now in San Antonio, Texas, in charge of the recently opened branch office of the Cyclone Fence Company. He was formerly at the Fort Worth office of the same firm. Some of you may know that Al is also interested in a Colorado gold mine. However, he is not planning to retire for some time to come.

From the great open spaces of Arizona word comes from Jim Clifford, who is teaching at the Evans School, a ranch school in Tucson, to the effect that he is in the grandest place on earth. He writes: "Every day the sun shines just as brilliantly and I am as brown as anything all over. I have taken up polo and spend most of my off hours literally off. I am trying this fall to train several cow ponies for polo and believe me it is some sporty job. Very few days go by that I don't fall off for some reason or other. However, the sand is soft and easy to light on, so I continue intact so far." Jim went to Arizona for his health and certainly sounds

as if he had regained it completely. I wouldn't mind calling on him some time. Perhaps Jim might be able to show me how to hit a polo ball. I tried it while I was away in the Philippines but usually found the ball too small and the field too large.

Henry Cunningham used to be one of the assistant national bank examiners but is now an assistant Boston Clearing House examiner. So it is that he has succeeded in landing in the right position where he does not have to leave town at all. If Henry has any special reason for wanting to be around Boston all the time, he is very secretive about it. He tells me that Milt Lyons was in town last month. Milt is with Kidder Peabody and Company in New York. He has left the statistical department and is now in investment sales as customers' man. The Lyons have an elegant home in Bronxville. — Phil Niles has left the investment department of the Metropolitan Life Insurance Company to take charge of the public utilities department of R. W. Pressprich and Company, 160 Broadway, New York City.

I hope that a lot of XV men make it a point to drop me a few lines regularly telling of their whereabouts and activities so I won't have to resort to cock and bull stories to keep you supplied with course items. — JOSEPH E. RUSSELL, *Secretary*, Technology Chambers, 8 Irvington Street, Boston, Mass.

1926

The Secretary invites from members of the Class suggestions for a location for the Class Reunion next June. Marblehead, Falmouth, and Lake Sebago, Maine, have been recommended and doubtless there are other ideas. The Secretary promises to bring before the Reunion Committee any recommendations sent to him.

C. E. Tony since his graduation reports that he has roamed around considerably and gathered in some good experience, and incidentally a wife and young baby. He worked as engineer for the Smuggler Company at Telluride, Colo., until that mine closed down. Then he moved to the Montezuma Copper Company in Mexico, where he got into Mexican atmosphere, and found the work very enjoyable and worthwhile. Hearing of an opportunity to take charge of the junking of the old Smuggler plant in Colorado, he took the job and saw it through and also attended to all of the leasing work on the property. Incidentally he did some independent mine examination work around Telluride. Recently he has returned East to become engineer at the old iron mine of the Chateaugay Ore and Iron Company at Lyon Mountain, N. Y.

On July 12, the engagement of Earl C. McMahon to Miss Miriam Ethelyn Thompson of Melrose, Mass., was announced at a tea given by her parents, Mr. and Mrs. Herbert A. Thompson. — The engagement of I. Chenery Salmon was announced to Miss Mary Cooper on September 5. Miss Cooper is a graduate

1926 *Continued*

of Smith College in the Class of '29. — Recently has come to The Review office the announcement of the engagement of Ervin W. Berry to Miss Dorris Flora Pearl of Salem, Mass. — News has been received of the marriage of Evan Frank Wilson to Miss Ruth Dayton Cook at Lake Chautauqua, N. Y., early this past summer. — Thomas H. Barry was married to Miss Joyce Gilbert Cran of Surrey, England. The wedding took place in the garden of Mr. and Mrs. John Kunhardt, Jr., in North Andover, Mass., on July 12. — Announcement was recently made of the marriage of Wilfred E. Carter to Miss Mary Ruth Wright in Natick, Mass. — Vincent Byron Bennett was married to Miss Alice White of Arlington, Mass., early in June. — An announcement of the marriage of William W. Farr to Miss Evelyn Bassett Madden on September 5, in Collingswood, N. J., came into The Review office. — J. RHYNE KILLIAN, *General Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

COURSE VI-A

The summer months have slipped by and not having a direct reminder of the recommencing of the school days, I forgot my duty in regard to this column until jolted from sublime blissfulness by the arrival of the October issue of The Review. Having stirred ever so slightly, I will wriggle my right hand sufficiently to add addendum to letters from our classmates. You see, nothing was said concerning the mental activity involved, for obvious reasons.

Nat Gada was good enough to write of his doings, and even though written some time past, you undoubtedly will enjoy hearing from him: "After graduation I took a trip to Atlanta, Ga., trying to pocket some heat for the coming winter which I feared might have been a cold one. I stayed there for two weeks and upon my return decided that traveling around wasn't so bad, so got aboard a boat and went to Europe, where I remained until October 1, 1927. While in Europe I spent time in Belgium, France, Spain, Italy, and Switzerland. Of course, needless to say I spent most of my time in France — visiting Amiens, Boulogne, Calais, Paris, Rheims, Bordeaux, Marseilles, Nice, Monte Carlo and so on; and lots of other cities I could mention, but I know they would be of no interest. All I did while over there was to forget work, study, and so on, but bent all my energies in having a good time, and believe me, I sure had one."

"Upon my return I took up my work with the General Electric Company, in the street lighting department at Lynn. I spent four months there, doing traffic and street lighting layout work, and occasionally going along with the engineers, assisting them in giving lectures before civic and municipal groups. I then went to Schenectady where I was assigned to the general office section of the lighting department. My duties there were to get prices, go over specifications for traffic signals that were sent in for quotations from air men in the field and

go out from time to time to deliver talks on signals before various city councils. After spending three months at the general office, I went out to Chicago where my duties were that of a specialist in all outdoor lighting. While I was out there I ran into several nice problems of lighting and traffic control. Outdoor lighting, of course, covers flood lighting of buildings, athletic fields, airports, swimming pools, railroad yards, electric foundations and whatnot. Street lighting is also a very fascinating game as well as traffic problems on the streets. I was very fortunate out there in that I was able to close several nice jobs. I remained there for one and a half years and then came back to Connecticut where I am doing the same kind of work. While I was out in the middle west I had the opportunity of visiting several of the larger mid-western cities where I addressed city councils and civic organizations on better lighting. I find that my work is very interesting."

Well, Nat seems to have seen a lot of the world since turning his back on the factory. Maybe we can get a P.S. from him relating his experiences since then. Now that the college boys have returned to New Haven and partially relieved Nat of his responsibility of seeing to it that the fair sex of that hamlet is enlightened on various subjects, he may find time to do so — and we sincerely trust that he will. — BENJAMIN P. RICHARDSON, *Secretary*, 29 South Second Avenue, Mount Vernon, N. Y.

1927

Kenneth A. Smith sent in the following letter: Having noted an absence of '27 notes in The Review for several issues, I am undertaking to send in what facts and gossip has come my way in the hope that we may gain a place among the active classes again.

To dispose of myself first: I spent two years with the Turner Construction Company, one year out on buildings in New York and Newark and the second doing cost work in the Philadelphia office. I left them to join an outfit in Newark that manufactured and engineered some patented coal handling apparatus. That was all right while it lasted, but the concern landed in the bankruptcy courts last February, due not entirely to my efforts, I hope, and I came to work for Marc Eidlitz and Son, Inc., in New York City. I have been working on the new Irving Trust Building at the corner of Broadway and Wall Street since the middle of February. The chore is again cost work, but the term can and does become almost too inclusive at times. It is an interesting job, that of having a hand in the erection of a modern fifty story skyscraper. To keep me entirely out of mischief, I have been teaching calculus in C. C. N. Y. night school for the past two years. After having taught one course six times, I begin to know the difference between a derivative and a differential. I am still struggling along to support myself and am not yet a candidate for marriage. Paul Eaton, XV, spent last year at Harvard and is now instructing in English

at the Institute. — Dice Coburn, XV, has been with the International Harvester or one of its subsidiaries in Chicago since graduation. He was married last May. — Johnnie Field, XV, was last reported with the Southwestern Bell Telephone in Dallas, Tex. — Dick Hawkins, II, shipped aboard some sort of a steamer and went around the world. Came back and went to work for a Rochester outfit. He has traveled quite a bit on his job and has no doubt run into a good many classmates. He was seen at the Reunion in June. — Irving (Tubby) Small, II, went to Springfield and put in some time crawling through concrete pipes as an inspector, but made a radical change and is now superintendent of a laundry in Springfield. He is married. — Dick Carroll, II, is also in Springfield and is associated with his father in machine design and foundry work, as near as I could understand it.

Don Miller, VI has had the tough luck to have had to spend a large part of the past three years under the doctors' eyes and has not been able to do much. I understand he is much better now. — Henry James, XV, is with the Bartlett, Hayward Company of Baltimore and travels around the country erecting gas holders. I have seen him in New York and Philadelphia. He was in Chicago for some time but is now back in New York. — Ike Swope, VI, is with the Philadelphia Electric Company in Philadelphia, as is Connie Barry, VI. — Amund Enger, XV, studied in Germany and France for a couple of years and is now engaged in his father's business in Norway. He got married last May. — Dal Sparre, X, has been with the duPont Company since he left the Institute and is located in Parlin, N. J. — I saw George Houston and Glenn Jackson in Newark a week ago. They are both out to put the town of Newark on the map as members of the David Houston Corporation. You probably know more of them than I do. Jackson has seen a number of '27 men while traveling in the job he held before he came to Newark. They are both married.

The Class President, James Lyles, stepped out of the fast thinning bachelor ranks on October 25, when he married Miss Molly Graham Gayer of Fulton, N. Y. When I last had lunch with him he had it all figured out to the exact number of minutes. He is still with Harris Forbes. — Russ Westerhoff, the only member of my own Course (I) that I have seen in ages, is with Ford, Bacon, and Davis here in New York. He is engaged and unless he can wiggle out of it, he is scheduled to get married in February. — I used to see Spitzli, X, when I was in Newark. He is with the Congoleum people and has recently been married. — I understand Dick Cheney, I, has recently been transferred to New York after having been all over the country for the Hobart Manufacturing Company. — Ed True, XV, is also with the Hobart Manufacturing Company in New York. He was married to Anna Eilertson on September 8.

1927 Continued

Whittier, X, is now in Philadelphia with Congoleum, I think. I used to see him when we were in Newark. — Westerhoff and I ran into Himrod. He was then working in a mine near Butler, N. J. He had been all over this country and part of South America before that. — I saw George Copeland, I, in Philadelphia a couple of years ago. The last I heard of him he was still in the middle west for the Austin Company and was engaged on the designs of the Russian Ford plant. — George Evans, I, who took his senior year with our class, is still with the Turner Construction Company and was last heard of in Des Moines, Iowa. He is said to be married. — Greenhalge started with Turner also, but quit and went to teach school at Brown and Nichols. I saw that he went to England a year ago as amateur coach of the crew they entered in the Henley.

While I was in Boston at Christmas time, I picked up a paper one day and noticed a picture of Herlihy, I, in flying costume. He was scheduled to arrive at the airport that day. His title was chief engineer of the T. A. T. in charge of airports, I believe. — I have not seen Drisko, I, since he got back from his trip around the world but imagine that he has some interesting experiences to relate. — I bumped into a Course XV man one night as I was coming out of the subway at 59th Street. I think his name is Rosenthal. We used to call him Rosy, and I am uncertain as to the last syllable of his name. He is working in Bloomingdale's Department Store on merchandising and research.

One night over a year ago, I dropped into the Technology Club and bumped into Lew Baker, who was president of the class our freshman year. He was doing survey work on an airport on Long Island. The same night I saw Bob Richardson. He was with some engineering firm in New York, but had spent a couple of years in the west. — I used to see Harry Fitzpatrick, I, (I believe he has shortened his name to Harry Fitz, now) when we were both with Turner. I lost track of him as he grew tired of time-keeping and left the company. I understood a while back that he was connected with one of the municipalities around here on concrete inspection, or something of the sort. — A man by the name of Patterson, Course IV, was with Turner, but I never ran into him. They have kept him moving. He was on the James River Bridge for a time and left Philadelphia just before they sent me there. The last I heard of him he was in Texas on a job for Turner. — I have not seen Hank Steinbrenner since commencement, but I understand that he was at the Reunion. Glenn Jackson saw him in Cleveland, also.

Westerhoff got up to the Reunion. I was busy giving and correcting exams and could not make it. He said that Marcuccello, I, was engaged on the new dormitories at the Institute. — I went to a studio one night to look at some sets a man I knew was working on and found Dale Stetson busy working on the same

designs. Glenn Jackson sees him now and then and is my authority for the fact that he has been in Europe, has worked in Hollywood and is now back in New York with Norman Bel Geddes. — Jackson is also my source of information as to Wally Farr. He is said to be married and had gone to Europe recently to study aviation, I think. — JOHN D. CRAWFORD, *General Secretary*, General Radio Company, 30 State Street, Cambridge, Mass.

1928

Since the November Review went to press I have had the good fortune to receive a long and newsy letter from Charlie Richheimer, XV₁ who is touring the Orient. It would probably be interesting to you all if I should quote the letter, so here it is: "While in Shanghai, by the merest chance I met Wally Kwok. Wally is the only one of our time at Technology in Shanghai. There is a Merrill, but he's the class of '96. Well, Wally, his brothers and sisters, friends, mother and dad sure showed my mother, dad, and myself a wonderful time in Shanghai. Wally's father is a very well-known man in financial circles in Southern China and Wally himself is making his name known. He is assistant in charge of the new mint just completed in Shanghai. He's a busy boy but still the same smiling Wally and he still keeps up with his boxing. He wishes to be remembered to you and to the rest of his friends back in the States. Wally gave me some news of George Flynn who used to be on the boxing team, too. He was up in Pekin but later moved to Tientsin.

"Finally I had to say goodbye to Wally and his folks and believe me I was sorry. From Shanghai we went through Nagasaki, Moji, and Shimonoseki (Japan), thence to Keijo (Seoul), Korea (Chosen), on to Mukden, Manchuria, and then by rail to Pekin. Had a wonderful time in Pekin sightseeing, then went down to Tientsin. While there looked up George Flynn at the Texaco office but during the time we had been traveling around he had been transferred down to Shanghai, so probably now he and Wally are making whoopee in Shanghai.

"We are now at Darien and from here we go to Port Arthur and see the surrounding territory and then leave for Kobe, Japan. We'll stay in Japan some time but we've done some traveling to get there and some of it, especially through North China, I'd never do again unless living conditions get a whole lot better and the country settles down instead of being in constant civil upheaval. As yet, I can't make myself understood in either Chinese or Japanese very well, but have hopes that I'll be able to get along in Japanese before I finally leave. It's much easier than Chinese but that's not saying a great deal."

News from Akron, Ohio reveals that Bus Ruch is going great guns for the Goodyear Zeppelin Corporation and is now in charge of the production control department working directly on the construction of the huge airship now being constructed at the Goodyear Air Dock.

Incidentally, that Dock is so large that eleven football playing fields could be laid out on the floor inside. It is the largest building in the world without inside supports. — Dormitory men will be interested to learn that Chuck Sampson's official engagement to Sig McNeilly has been announced. Chuck is working with his father in Rochester, N. Y. His address is 221 Edgerton Street, Rochester.

On August 20, 1930 at Saratoga Springs, J. K. McAfee joined the proud and ever increasing ranks of '28 fathers. John's baby is a boy and is named John K. McAfee, Jr. — Slim Maeser is still instructing in the Testing Materials Laboratory at the Institute during business hours and driving a Ford sport coupe the rest of the time. — Lew O'Malley has returned from another trip to Mexico and the Canadian Northwest.

That's all this month. How about some letters? — GEORGE I. CHATFIELD, *Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

COURSE I

An important card from Hurlbut says "Esther and Terry Hurlbut announce the arrival of Terry Allison Hurlbut, II, on July 22, 1930." More congratulations in order and heartily given on behalf of the gang. Terry's address is 11 Grey Street, Cambridge. — While passing through Chicago on my vacation this summer, I was able to talk to Ken Clark for several hours. As reported in July Ken seems nicely settled once more with the Chicago Sanitary District. With mention of Ken usually comes mention of Luby. The latest on Jack is that he was with the Wabash Railroad until March. Then he was field engineer for the Diamond Alkali Company, until May at which time he had to give up work to have an operation for goiter. That is the latest we have. — Another summer finds Cy Meagher and Ed Ure still with Barney-Ahlers here in New York. Cy is in the estimating department. I believe he is now living in New Jersey but have not been able to obtain the new address. Ed has been working outside on the construction of two concrete warehouses. His address is unchanged, 546 West 156th Street, New York. Both Cook and Topping hit New York this summer after completing their contracts in Venezuela with Lago Petroleum. Cook is working for the same subway contractor as is Mike Cohen, and is finding the work equally interesting. Bob can be reached at 122 Underhill Avenue, Brooklyn. Topping, unfortunately, reached here when the demand for engineers seemed to be nil, and so was having some difficulty getting located. However, I saw him last about six weeks ago, so by now he is undoubtedly hard at work. In due time I shall find out where. His address is 106 West 56th Street, New York.

Mangurian has been down from Hartford several times this summer. He has also made frequent trips to Boston so has probably been able to see more of the gang than have most of us. When George reads this he will probably be relieved to note

1928 *Continued*

the omission of an untrue story circulated by none other than himself and believed by many. For details write him c/o Chance Vought Corporation, Hartford, Conn. — Need we add that many of you could send in your autobiographies for the past six months, a year or even more, without repeating anything you've told before? Let's have them before the next issue of The Review. — GEORGE P. PALO, *Secretary*, 1095 Jerome Avenue, New York, N. Y.

COURSE VI

It has been such a long time since any Course VI notes have appeared in the Review that undoubtedly many of you have wondered if your Secretary had not undertaken a Stygian voyage, or at least crossed "that great abyss called marriage" within the last six months. But here we are with proof to the contrary to assure you that nothing but the present business depression has occurred to disturb the even tenor of your Secretary's way. He is still engaged in proselytizing industrial purchasers in New England to the opinion that the Electric Machinery Manufacturing Company produces the best synchronous equipment that is manufactured in these United States. Bob Mercer is similarly engaged in the New York office of the same company, and is making excellent progress, if the statements of company officials are to be relied upon. Bob crashed through with a very newsy and interesting letter several months ago regaling the professional and extra-professional activities of '28 Course VI men in New York City. — Jim Ryan is now in the New York office of the Westinghouse Company, engaged in sales in the Mill Section of the Industrial Division. We had the pleasure of meeting Jim at a convention in Boston this summer. He's the same old Jim, and still warbles a mean "Carry Me Back on a Special Train."

Johnny Metcalf, who has been reported previously in these columns as being engaged as a Safety Engineer with the Liberty Mutual Insurance Company, has been transferred to the Rochester office. If any of you have any factories that you would like made safe and sane, get in touch with Johnny. He guarantees satisfaction — your money will not be refunded, however.

Bill Phillips is also working in Rochester, we understand, but just what company he is with and what vicissitudes of life and fortune he has encountered since that memorable day in June 1928, when we marched to the platform of Symphony Hall under the admiring eyes of relatives and friends, are still very much in the dark. Won't you take time out for half an hour some evening, Bill, please, and drop a brief note telling the story in detail? We'd appreciate it very much.

Laurie Glassman received his master's degree last year, specializing in railroad electrification, and is now with the consulting engineers on the Pennsylvania Railroad's \$100,000,000 electrification project. I should also like very much to hear from Laurie.

Harry Blanchet, who is with Brooklyn Edison, is a member of the New York contingent who gather at the apartment of Fred O'Brien, Bob Peatfield, Bill Murphy, et al, at 107 West 84th Street, on occasion, to celebrate in true M. I. T. style. Your secretary had heard so much of this rendezvous (now generally known as the M. I. T. Club of Upper New York) that he deemed it incumbent upon himself to pay his respects. And so during the summer he made a special trip to the big city with the avowed purpose of visiting the above-mentioned rendezvous, and was so hospitably received by the hosts, and shown such a good time, that he recommends it to every '28 man who may find himself in that neck of the woods. The latch string is always out, the boys say.

Ted Pierce and Francis Stetson are also with Brooklyn Edison, but in just what capacities we have not been able to determine. — Leo Myskowski was with General Electric at Buffalo at the last report.

We met Bob Wise at the Reunion in June, and during the course of a very hectic and convivial evening, he managed to find time to confide that having received his degree from the Harvard Business School in June, he was planning to go into the Schenectady plant of the General Electric Company in the Production Department. Good luck, Bob! How's to drop a line some day anent life and work at Schenectady?

Last but by no means least we record the marriage of Johnny Carvalho to Miss Marjorie Dean of Fall River and Brookline. The event, that added one more to the growing list of benedicts, took place at The Little Church Around the Corner in New York last April. The New York gang tendered Johnny a farewell bachelor dinner the night before. Mr. and Mrs. Carvalho are now at home at 560 Pasadena Avenue, Wilkinsburg, Pa., where Johnny is working for the Westinghouse Company in Control Engineering. I am sure the entire Class joins me in wishing them the very greatest happiness.

Thus endeth the notes for Course VI. But won't some of the rest of you boys please break the silence that has to date cloaked your doings and let us know where you are and what constitutes your chief interest in life? Don't forget that we shall be glad to hear from you. — PETER H. KIRWIN, *Secretary*, 7 Grosvenor Place, Roxbury 19, Mass.

COURSE VI-A

In order to visit all the fellows in their different lairs, we have to cover a lot of ground. So let's charter an aeroplane, take some sandwiches and a few Austins and start on a country-wide tour to pay a visit to our classmates.

Before hopping off, let's go up to the Institute and pay our respects to Professors Timbie and Wildes, who so carefully guided us through five years of our infancy. We can also say hello to Otto Brune and Johnson, who are at work in the Institute's Research Department.

THE TECHNOLOGY REVIEW

Before leaving, we can go over to see Chet Day, who is with the New England Telephone Company in Boston. Chet, by the way, was married October 4. We extend out congratulations to the happy couple.

On to Pittsfield where we stop over to see Alimansky, who, I think, is still in the Transformer Department of the General Electric Company. How are you Max? Now to Schenectady, flying low to see Ver Plank, St. Louis, and Poitras working diligently in the General Electric Company. Just what they are doing I don't know. It's no use to stop to hunt for them as we have no pass to get in at the gates. We certainly would appreciate a line from you fellows with all the latest news.

Taking a course due west, we find ourselves over Rochester where we can wave to Johnny Hepburn who is, or at least was, with the Electric Railway Signal Company. Johnny is probably working on a device for trains which will automatically announce the stations they will stop at, those it has stopped at, different times of arrival, and the notable people on board. If I'm right, Johnny, let me know about it. Now we are passing over Buffalo and there is Joe Riley. Joe is with the Long Lines Department of the American Tel. & Tel. He was last seen in Buffalo qualifying as a "Pad Control Expert." Not that we have the slightest idea what that might be, but the title has evoked considerable comment.

C. C. Smith is with the Detroit Edison Company and it would be a stroke of luck if we could see him. He is another one who keeps quiet about himself. How about a little news, Smitty? — From here let's take a run down to Cleveland and see Fritz Rutherford. Last news we had Fritz was engaged. Somehow the printer left this news out of our last write-up, but better luck this time. If this engagement has gone any further, Fritz, or if the job is any better (or worse), we should like to hear about it.

And now to Chicago or thereabouts to see Prendergast at the Hawthorne Works of the Western Electric Company. Here again it is merely assumed that he is still there. Last we heard of him, he was getting along famously with the Y. W. C. A. We're not landing on the grounds of safety but we're saying hello and hope to hear from you soon. — Sandwiches are now in order as we have a long trip to Wenatchee, Wash., where Ferdy Myers and his bride are tucked away in the mountains. Ferdy is with Stone and Webster. Next year when the postman stops out there, how about giving him a postal card with a little information about yourself?

After an over night stop here we'll tune up the plane and head for Texas. It was originally planned to include in this trip a visit to Lu and Hu. According to the newspapers, it's hard to say who is in the most dangerous place, Hu and Lu in China or Prendergast in Chicago. They were all big shots and that's the trouble.

1928 Continued

Well, if it isn't Harry Hodsog coming down in a 1909 Model T parachute, heading for the high-power transmission lines, but hot wires never did bother Harry anyway. When you land, how about a line on what you are doing? Last December when I saw you in Boston, the outcome of your visit there was uncertain.

Forecaster Starr says that the weather is bad over the Pacific so we're heading for the Austin Airport, Texas, where we find waiting for us none other than Art Elliott, down there for Stone and Webster, and Bradshaw who is stationed on the border line with a Fox Movietone Camera waiting for some rebels to come over, or other news events. There is little detailed information in the files about these two fellows, but we did find this much of a line on them.

Phoenixville, Pa., is our next stop to pay a visit to Hal Curtis and his bride. He has a big house there so we can probably stop over night. Hal is with the Development Research Department of the American Tel. & Tel. at times, but we understand he is very much married. Congratulations, Hal.

Our next stop is the Newark Airport, but we can say hello en route to Jack Barnes who is at Princeton University studying for his Doctor's Degree in Mathematics.

At the airport we use our Austins to travel around and see as many of our friends as possible in this vicinity. Armstrong and Lyons are living in Montclair. Armstrong is in the Traffic Department in the Western Manhattan Division of the New York Telephone Company. Chick Lyons is with the Long Lines Division at Rector Street in the day time. At night, he is either at Harlem or Montclair. For those who do not live near New York, Harlem is New York's rainbow, that is, the colored section. At East Orange we find Jim Tulley working for the Bell Laboratories (and still popular with the girls); Ted Perkins is working for the I. T. & T. (and he says he likes it); and Pete Zugale, who is with the New Jersey Bell Telephone Company. Pete is now saving up to entertain another out-of-town girl friend. He just recently got a "feint" idea of New York's night club life. — At Plainfield, N. J., we find a very happy family, headed by Frank Sweeney. Frank was always going to send Frank, Jr., to M. I. T., but now we're wondering where he plans to send the newest addition to the family, little Patricia. Between the job at the Graybar Electric Company, golf, and the family, Frank is kept pretty busy. — Somewhere over in the wilds of New York City, we can find Rumpel, who is with the Bell Laboratories; Bowser, who works for the New York Telephone Company; and Manty Burgess, an American Tel. & Tel. employee. When Manty got his job he asked for something technical, so they buried him in a little hole at 195 Broadway, dumped in a load of problems, and we haven't seen him since. Maybe he's saving up to buy a magistrate's seat in New York.

Before crossing over to Brooklyn, it will be necessary to secure our passports, but any politician can get us there, so we'll go over and see Cliff Edgar and Noel Olmstead. Cliff is with the Traffic Department of the New York Telephone Company, while Noel is a Radio Engineer with the American Tel. & Tel. in New York. They live together here in Brooklyn.

Further out on the Island at Baldwin, L. I., we find Al Carey's apartment. We won't find him in, but we do know that he works as Traffic Superintendent in the New York Telephone Company. A step further on at Freeport we can all stop at my house for the night. In case anybody's interested, I'm still with the Commercial Department of the New York Telephone Company in Brooklyn. Cliff Edgar is under me, that is, he's on the first floor.

Back to the Airport and off in our plane to Poughkeepsie. En route we may see Jimmy Rae splicing some wires or doing something like that for the Long Lines Department of the American Tel. & Tel. We last heard from him at Paterson, N. J., but, of course, that may have been only a stall. There isn't any good airport here so we'll just swoop down low enough to see Hennie Wengen hard at work collecting bills for the Central Hudson Power and Light. Hello Hennie, we haven't heard from you in a long time.

To complete the trip we'll land the plane on Charles River Road instead of the Boston Airport, thereby meet the Cambridge Police Department, and this will certainly complete our trip.

There are a few fellows that we couldn't visit because we had no idea of where they are located. I refer to Babb, Briggs, Darnell, Helms, and Pursell. Please drop us a line so we can pass the good word along to the rest of the crowd.

About the time this article gets into print it will be Christmas, so it seems quite in order that we wish you all a Merry Christmas and a Happy New Year — and so to bed (with apologies). — HUYLER B. ELLISON, Secretary, 41 Wallace St., Freeport, N. Y.

1929

Pause a moment, classmates, and question yourselves and the motive behind your perusal of these notes. Of what are you in search? Perhaps a bit of news about some classmate who is on the other side of the continent or in a different hemisphere. Your news of his life and success has been scarce, perhaps, since we all left the atmosphere of Technology. You guess that he has been pretty busy and has not had the time to write. Maybe you have noticed that he has not even had time to drop us just a line for publication in these columns. One thought following another may lead to the thought that possibly you, too, have been just as busy. If such is the case, just drop a line telling us about the things in life that keep you busy, how you are and where you are.

Brig Allen is still trying to sell electric motors for the Reliance Electric and Engineering Company but he is now

covering Philadelphia and vicinity. According to all information, Brig is doing very well, which we are all pleased to hear. Early in the Fall he was all tied up with a good old-fashioned case of the flu, but managed a good comeback. Brig breakfasted with Okey O'Connell and Ralph Vezin the other day in some old hangout they have developed in the Quaker City. "Okey was there as usual, but Ralph seems to be getting lazier or more ambitious, I don't know which, because he finally had to run for his train," Brig writes. He also adds that Ralph and Okey seem to be getting along fine; Okey doing some kind of material checking work, and Ralph figuring out how to make the Baldwin Locomotive products faster and oftener.

Brig writes further as follows: "Had a funny one the other day. Phone rang and Jack Hallahan was on the wire. No one had heard from him for a heck of a while. He went down to Texas for the E. G. Badger Company a year ago erecting oil refinery equipment. He wandered all over Texas as far as I can gather, and then went up to Tulsa for a while and finally is located here with us in this town of brotherly love for a month or so erecting a still for the Gulf. He tells me if I know of anyone that wants the straight dope on a domestic still of the Hallahan design, he will oblige and erect and operate the same for very little. He hasn't changed a bit except that he has picked up a Texas drawl which sounds funny after his New England twang. Said that he hadn't done any running since he left school except for the mayor of a little town out in Oklahoma."

"Spent a few days in Boston on my vacation, stopped in and saw Bernard Brinkhaus Brockelman in Worcester. He is with his father and is now in the Worcester Market managing the bakery. He took me through the whole works and they have quite an establishment — one that any city could be proud of. He tells me that he is too busy to do anything to speak of, puts in twelve hours or so a day. He gave me a good lunch of pig's knuckles which I remembered him by for a week. — Stopped in to see Elmer Skonberg in Springfield but found him on some kind of a vacation, too. — I understand that Ed Ware is down in Louisiana. I don't have the address handy here, but will send it to anyone that wants it. His side kick, Amasa Smith, is in Birmingham with the Chicago Bridge. — Both Fish Hills and Eric Bianchi changed their jobs a while ago and when they compared notes they found that they were both working for the same outfit, Dewey and Almy in Cambridge. It seems that they have a slew of fellows from our Class with them. — Charlie Denny writes me that Chuck Worthen and J. J. Wilson are both in Pittsburgh working for Crucible Steel. It seems that they have been sick and John had several stitches taken in his head from the same bender.

"I understand that Dick Boyer is working for some moving picture outfit. He is a sound engineer and spends his days sitting all over the different theatres

1929 *Continued*

in New York listening to the talkies and then doing something. The better the picture the more he has to report that was wrong. I wish they'd try sitting around some of the theatres here and do something besides freezing to death. — I also understand that Bill Thomas has gone back to South Africa. I've been trying to locate him so if he hasn't gone back and reads about having been reported back, I hope he'll be put out enough to get in touch with me. — Jack Osborn is working in New York for the Hemphill Noyes Company at 15th and Broad. As far as I know he is still single." Thank you, Brig, for myself and for the Class.

We are all getting along as well as can be expected out here in the depressed tire industry. Ray Delano left Goodyear the first week in September and is now back in New England. Hank Gibbons and Hal Dick are still out with the Goodyear Zep Corporation. Johnnie Hartz and Gene Gilman are still with the chemical engineering division and I am still in tire design, though on a different job. The rubber industry along with the rest has been through a period of hard times, but the large companies seem to have weathered the period successfully, while others are not as fortunate. Considerable readjustment will take place when things pick up in general business and most of us will be affected. Until then we are forced to sit tight and work for the upturn.

E. Neal Wells, VI, and Ernestine Killingsworth were married on June 24 in St. Augustine, Fla. Many congratulations and good wishes from the classmates of '29, Neal. May the future hold supreme happiness for you. — Harry C. Weare, I, and Eleanor Clapp were married in West Roxbury, Mass., on September 30. Our congratulations are extended to Harry and best wishes are many for the couple. The last note I had from Harry stated that he was working in New Jersey.

One and all let us take a little interest in our notes and see if we cannot make them full and interesting. News is the life of these columns. You have it; now send it in! — EARL W. GLENN, *General Secretary*, 339 Hillwood Drive, Akron, Ohio.

1930

COURSE VII

Although none of the former parasites of Course VII have written to tell of their various good fortunes, your ever faithful Secretary has, with the diligence of a vital statistician, combed the morbidity sheets of a half dozen respectable communities and finds that: Larry Abare is superintendent of a clam purification plant near Plymouth, Mass. — Morris Shaffer has returned to the Institute as a full time assistant in the department. Morrie ran into considerable trouble this fall when he announced that hereafter he would take upon himself a middle name. Introducing, Mr. Morris Frank Shaffer, accent on the "Rank." — Dick Foster is working with the Whiting Milk Company in Providence, R. I. Every once

in a while Dick sends someone a postcard which manages to find its way to the bulletin board. This is a habit that should be encouraged.

Your Secretary was with the Army for six weeks at Fort Humphreys, Va. He unwittingly wrote a letter to Art Heitz telling him about the weather and other advantages of being down south. Art is at present bacteriologist for the City of Portsmouth, Va. In his last letter he sends his best regards and wants the boys to write him. His address is: New Market Building, Department of Public Welfare, Portsmouth, Va. — Bud Carter is studying medicine at B. U. — Milt Mezoff is an assistant instructor at the same institution. — Cecil Dunn spent the summer reading Army regulations together with your Secretary. Both of us are now pursuing advanced courses at the Institute. — Dave Stanley is back at school and is busy supplying Larry Geer and Bob Harris with Corona Coronas. St. Louis lost a ball game so the story goes.

Send in your news and we'll try to initiate some ideas on a get-together soon. — SIDNEY L. KUPOSKY, *Secretary*, Department of Biology and Public Health, M. I. T., Cambridge, Mass.

The Technology Club of Rochester

The 20th Annual Meeting of the Technology Club was held in the main dining room of the new University Club, on Thursday evening October 9, following a banquet which was attended by 85 members and guests of the Club. This was the largest attendance that has ever been recorded for the Rochester Club and was due in a large measure, we believe, to the fact that the speaker of the evening was Karl T. Compton, the new President of Technology.

Rochester's greeting to President Compton was extended by President Rhees of the University of Rochester. Dr. Compton gave a very clear and interesting picture of many phases of the developments which are taking place both in the organization and the building proper in Cambridge.

He arrived in Rochester shortly before noon of the day of the annual meeting, called on Mr. Eastman and spent several hours inspecting processes at Kodak Park. His entire day on Friday, October 10, was spent in connection with the dedication exercises for the Men's College of the University of Rochester, which is being opened this fall on an entirely new site, on the west side of Rochester adjacent to the Genesee River.

For the third successive time our Club will maintain a full tuition freshman scholarship this year at the Institution. Announcement was made that the award for 1930 has been made to Mr. Emerson T. Kron of 178 Melrose Street, a graduate from West High School last June. The Club is proud to note that the three boys who have been sent to the Institution in preceding years have made excellent records, both in studies and in activities at Cambridge.

THE TECHNOLOGY REVIEW

At the business meeting it was voted to again donate \$50.00 to the M. I. T. Athletic Association. The Treasurer announced that the cash on hand, prior to taking dues for 1930, was \$365.17. Seven new members were voted into the Club. The following officers were elected for 1930-1931: Charles F. Wray, '95, President; William W. Vicinus, '23, First Vice-president; Edward S. Farrow, '20, Second Vice-president; Clarence L. A. Wynd, '27, Secretary, 112 Meigs Street, Rochester, N. Y.; Hazen C. Pratt, '22, Treasurer; Donald B. Kimball, '20, Executive Committee (three-year term). — DONALD B. KIMBALL, *Secretary*, 60 Greenway Road, Brighton Sta., Rochester, N. Y.

Indiana Association of M. I. T.

A meeting of the Association was held at the Spink-arms Hotel, Indianapolis, on Friday, October 10, 1930. Several of the members from Purdue University, Dean Andrey A. Potter '03, Professor William P. Turner '86, John L. Bray '12, and Warren E. Howland '22 came down from Lafayette.

After dinner, Otto Mueller, engineer and architect of Indianapolis, a Purdue graduate, discussed the plans for and means of moving the Headquarters Building of the Indiana Bell Telephone Company at Indianapolis. This is an outstanding engineering feat as the building, occupying a space of 100 by 135 feet and eight stories high, is being moved from the northeast corner of the Telephone Company's property to the northwest corner. Because of the shape of the building, it is being moved south 50 odd feet and then being given a quarter turn to its new location. This is an 11,000 ton building and is being moved while occupied, with all the service continued. — NORMAN D. DOANE, '15, *Secretary*, 2035 North Meridian Street, Indianapolis, Ind.

M. I. T. Club of Western Maine

We had a highly enjoyable informal dinner and outing up at Douglas Inn, Douglas Hill, Maine, owned and operated by our well known Dennie, alias Orville B. Denison '11, on Sunday, September 21, the last day of summer. Favored by a glorious day and following an excellent chicken dinner, we availed ourselves of the sports facilities of this highly hospitable hostelry (try saying that fast) and golf, croquet, obstacle golf, and shuffle-board were indulged in. Gene Fogg, president and loyal '06 man, showed his wares on the links and with a snappy 73 led the field, while Gene's wife and Lew Nisbet '09 won the shuffle-board tournament on Dennie's new standard size concrete shuffle-board.

Those present included: Mr. and Mrs. C. Hall Baker '22, Edward Birkenwald '28 and his mother, Mrs. C. S. Birkenwald, Dr. and Mrs. C. Eugene Fogg '06, Mr. and Mrs. Stanley W. Hyde '17, Mr. and Mrs. Lewis D. Nisbet '09 and Mrs.

Lester I. Beal '18, all of Portland; Mr. and Mrs. Hilliard D. Cook '21 and Mr. and Mrs. Edwin Sutermeister '99 of Westbrook; and Mr. and Mrs. Orville B. Denison '11 of Douglas Hill, Maine and Lexington, Mass.

It was decided to have the regular fall dinner and annual meeting in Portland on the evening of October 20. — RAYMOND F. BENNETT '99, *Secretary*, 1 Dana Street, Portland, Maine.

Technology Club of Chicago

On the occasion of his recent visit to Chicago over October 23, 24, and 25, Colonel Frank L. Locke '86 very generously gave of his time in being the Club's guest at luncheon and dinner on October 23. His timely visit proved to be of great benefit in that he brought us up to date regarding new developments and affairs around the Institute. It is worth while to note that the Personnel work being conducted under the direction of Colonel Locke is proving to be of inestimable value to industry, the Institute, and Alumni alike, and the cooperation of Alumni in this line of endeavor cannot be too strongly urged upon them.

A loss is felt by the Club and by the community as a result of the return of George A. Ricker '86, to Washington, D. C. Mr. Ricker continues in the services of the Portland Cement Association. — ERNEST KOHLER, JR., '29, *Secretary*, 6028 Kimbark Avenue, Chicago, Ill.

Technology Association of Northern California

The weekly noon lunches are proving quite popular. The usual attendance varies between ten and twelve, but the encouraging thing about it is that about six of these are a different six each week. It appears that, as time goes on, all of the active Technology men in the district will get around to a lunch sometime or other.

This district has been assumed to include everything from Santa Cruz and San Jose on the south to Sacramento and Napa on the north. In this territory there are apparently about 250 Technology Alumni. We have 93 of these on our present active list which consists of such men as have stated that they wish to be kept informed as to meetings and so forth. Recently we sent out a letter to 157 more and, to date, as a result of the letter, have added 15 more to the active list making the present total 108. We are in hopes of building this up to at least 150 before the end of the year.

Sometime or other we hope to stage a smoker, or as it is more popularly known in California, a "beer bust." We hope that we will be able to make the meeting comply with the implication of the name. The Secretary predicts that a record attendance will result if this can be done. It is not proposed to have any particular ceremony at this "bust" in the way of speeches or other boresome trifles. It is intended as a grand get-together. Doubt-

less some of the brethren may be stimulated to hold forth, but we feel that speeches arising in this manner are not apt to be boresome.

Any Technology men in San Francisco are invited to come to the Engineer's Club any Tuesday noon. The club is located on the top floor of the building at 206 Sansome Street. — JOHN K. HELLER, '16, *Secretary*, Ford, Bacon and Davis, Inc., 58 Sutter Street, San Francisco, Calif. Phone Douglas 6270.

New Haven County Technology Club

The New Haven County Technology Club will hold its annual meeting at the Sterling Chemistry Laboratory at Yale at which time the ballots recently sent out to the members will be counted. The nominating committee has submitted the following: President, William W. Gaylord '06, and Walter R. Weeks, '24; Vice-President, Stuart M. Boyd '18 and Hudson B. Hastings '07; Secretary, Charles P. McHugh '26, and Stephen B. Metcalfe '23; Treasurer, Charles J. Farist '19, and Edward M. Manning '26; Member at large, Governing Board, Gerald M. Keith '12 and Herbert R. Polleys '18. The time for this meeting is November 6 at 8:00 P.M. The speaker will be Capt. John H. Tweed, Director of the new municipal airport at New Haven, Conn., and his subject is Present Trends in Aviation. — WALTER R. WEEKS, '24, *Secretary*, 99 Blake Road, Hamden, Conn.

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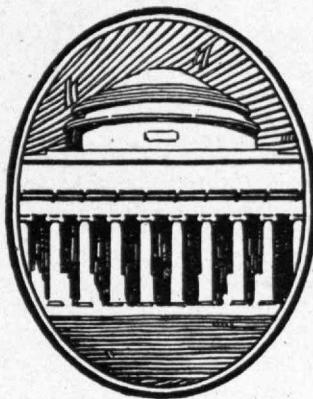
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The Institute publishes a variety of bulletins, fully descriptive of individual courses, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

Ask for the following circulars by their descriptive letters:

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ROOM 11-203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY
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A SINGLE-CONTROL OSCILLATOR

ALTHOUGH a vacuum-tube oscillator will deliver power at any desired frequency several adjustments are usually necessary for each frequency chosen. General Radio engineers have developed an oscillator operated by a single control by means of which the operator can readily produce any single frequency or sweep over the entire audible frequency spectrum.

The new instrument applies the phenomena of "beats," with which every worker in sound, radio, and light is familiar. For example, two tones differing slightly in pitch when sounded simultaneously produce a third tone having a frequency equal to the difference between the frequencies of the other two. In the General Radio beat-frequency oscillator the output power is the difference tone or beat between two radio-frequency oscillators. The frequency of one is fixed; the other is adjustable so that any audible frequency can be obtained.

This is another example of the problems with which General Radio engineers come in daily contact.

If you are interested in this oscillator, ask us for a copy of Catalog F-T which describes it. We would also remind you that our engineering and manufacturing facilities are available for the developing of new industrial applications of electron tubes. Correspondence is invited.

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